

# SERVICE MANUAL



ML500

Date	Revise Version	Description
2011.08.23	V1.0	Initial Issue
2011.09.5	V2.0	Modify Chapter 6 ,Chapter 3
2011.10.18	V3.0	Modify chapter 5,add new method to upgrade multimedia FW

Copyright OCT. 2011 All Rights Reserved

## Preface

This manual is applied to ML500 projection system. The manual gives you a brief description of basic technical information to help in service and maintain the product.

Your customers will appreciate the quick response time when you immediately identify problems that occur with our products. We expect your customers will appreciate the service that you offer them.

This manual is for technicians and people who have an electronic background. Please send the product back to the distributor for repairing and do not attempt to do anything that is complex or is not mentioned in the troubleshooting.

*Notice:*

*The information found in this manual is subject to change without prior notice. Any subsequent changes made to the data herein will be incorporated in future edition.*

ML500 Service Manual

Copyright OCT. 2011

All Rights Reserved

Manual Version 3.0

# Table of Content

## Chapter 1 Introduction

Highlight	1-1
Compatible Mode	1-2

## Chapter 2 Disassembly Process

Equipment Needed & Product Overview	2-1
Disassemble Top Cover Module and Key Pad	2-2
Disassemble LED Driver Board	2-4
Disassemble Main Board	2-5
Disassemble Fan	2-6
Disassemble Light Sensor Board	2-7
Disassemble Speaker and IR Board	2-7
Disassemble Engine Module and LED	2-8
Disassemble LVPS	2-10
Disassemble Bottom Cover Module	2-11
Re-write LED Usage Hour	2-12
Repair Action	2-13

## Chapter 3 Troubleshooting

Equipment Needed	3-1
Main Procedure	3-2
No Power Troubleshooting	3-3
Power Troubleshooting	3-4
Image Troubleshooting	3-5

**Chapter 4    Function Test & Alignment Procedure**

Test Equipment Needed	4-1
Test Conditon	4-1
I/O Port Test	4-2
Composite Port And Audio Test	4-7
S-Video Port Test	4-7
HDMI Port Test	4-7
3D test	4-8
SD Card /Mini USB/ USB flash disk test	4-8
Calibration	4-10
Run in test	4-12
Test Inspection Procedure	4-13

**Chapter 5    Firmware Upgrade**

Section 1: System Firmware Upgrade	5-1
Equipment Needed	5-1
DLP Composer Lite Setup Procedure	5-2
Firmware Upgrade Procedure	5-4
Section 2: Multi-Media Firmware Upgrade(USB)	5-7

USB Driver Upgrade Procedure	5-8
Multi-Media Firmware Upgrade	5-10
Section 3: Multi-Media Firmware Upgrade(SD Card)	5-13
Multi-Media Firmware Upgrade procedure	5-14
Section 4: 8051 Firmware Upgrade	5-17
Firmware Upgrade Procedure	5-18

## **Chapter 6    EDID Upgrade**

EDID upgrade procedure	6-1
------------------------	-----

<b>Appendix A</b>	Exploded Overview	I
-------------------	-------------------	---

<b>Appendix B</b>	Serial Number System Definition	X
	PCBA Code Definition	XI

# Introduction

## 1-1 Highlight

No	Item	Description
1	Dimensions (WxDxH)	● 220x170x41 mm
2	Power Supply	● Auto-ranging: AC100V ~ 240V $\pm$ 10%, 50-60Hz
3	Power consumption	● Normal mode: 120W $\pm$ 20%. @ 110Vac ● ECO mode: 60W $\pm$ 20% @ 110Vac
4	Keystone correction	● Vertical $\pm$ 40 degree
5	Throw ratio	● WXGA 1280x800 1.4 $\pm$ 5%
6	Projection lens	● YM102
7	LED life	20,000 Hours Bright Mode @ 75W $\pm$ 10 % , B50/ L50*Note Survival Rate
8	DMD Chip	● TI" DMD , 0.45" WXGA DMD
9	System controller	● TI DPP6401
10	Throw Distance	0.52m ~ 3.00 m (mechanical travel range) 0.91m ~ 2.40 m (optical travel range)
11	Video compatibility	Standards : ● NTSC M/J, 3.58MHz, 4.43MHz ● PAL BG/DK/I/M/N , 4.43MHz ● 480i, 480p, 576i, 576p, 720p, 1080i
12	Input signal spec	● Analog RGB signal (PC) - Analog RGB 0.7 $\pm$ 0.1 Vp-p, 75 ohm - Separate TTL H,V Sync. ● Video signal - NTSC/PAL Composite video 1.0 $\pm$ 0.1 Vp-p, 75ohm ● Audio signal - 900mVrms, 22K ohm

No	Item	Description
13	Altitude&Temperature	<ul style="list-style-type: none"> <li>Operating: 0 ~ 2,500 ft, for 5°C~35°C 2,500 ft ~ 5,000 ft, for 5°C~30°C 5,000 ft ~ 10,000 ft, for 5°C~25°C</li> <li>Operating: 5 ~ 35 °C Non-operation:-20°C ~ 60°C</li> </ul>

## 1-2 Compatible Mode

### • Computer Compatibility

Compatibility	Resolution	V-Sync [Hz]
VGA	640 x 480	60
	800x600	60
	1024x768	60
	1280x720	60
	1280x800	60
Video	480i/480p	60
	576i/576p	50
	720p	50/60
	1080i/1080p	50/60
HDMI	480i/480p	60
	576i/576p	50
	720p	50/60
	1080i/1080p	50/60

- **Compatibility: Document**

- **Compatible Document Format**

Office Version
Microsoft® Office 95
Microsoft® Office 97
Microsoft® Office 2000
Microsoft® Office 2003
Microsoft® Office 2007
Microsoft® Office 2010

- **Compatible Document Format**

Microsoft® Office Application	File Extension
Word	.doc .docx
Power Point	.ppt .pptx
Excel	.xls .xlsx
Adobe PDF	.pdf

- **Media File Support List Video**

- **Video**

File Type	Video	Resolution	Bit Rate	Frame Rate	Audio Code	Remark
AVI MKV	XVID MPEG4 H.264 M-JPEG WMV3	1080P	20Mbps	30fps	AC3 DTS MPEG1/2/3 PCM ADPCM AAC	No support VC-1 AP H.264 support less than 4 reference frames
TS	H.264	1080P	20Mbps	30fps	AC3 AAC MPEG1/2/3 DTS LPCM	H.264 support less than 4 reference frames
DAT VOB MPG MPEG	MPEG-1	1080P	20Mbps	30fps	MPEG1/2/3 AC3 DTS LPCM	



MOV MP4 3GP	MPEG-4 H.264 H.263	1080P	20Mbps	30fps	AAC AMR PCM ADPCM	H.264 support less than 4 reference frames
RM RMVB	RV3 RV4	720P	5Mbps	30fps	Cook(RA4) AAC(RA9) RACP(RA10)	
WMV	WMV3	1080P	20Mbps	30fps	WMA2 WMA3	No support VC- 1 AP

## - Image

Image Type (Ext name)	Sub Type	Encode Type	Max Pixels
JPEG JPG	Baseline	YUV400	No Limit
		YUV420	No Limit
		YUV422	No Limit
		YUV440	No Limit
		YUV444	No Limit
	Progressive	YUV400	Width<=10240 & Height <= 6400
		YUV420	
		YUV422	
		YUV440	
		YUV444	
BMP			No Limit

## - Music

Music Type (Ext name)	Sample Rate (KHz)	Bit Rate (Kbps)
MP1/MP2/MP3	8-48	8-320
WMA	22-48	5-320
OGG	8-48	64-320
ADPCM-WAV	8-48	32-384
PCM-WAV	8-48	128-1536
AAC	8-48	8-256

*Note: If the Computer Compatibility supportive signal is different from User's Manual, please refer to User's Manual.*

# Disassemble And Repair Action

---

## 2-1 Equipment Needed & Product Overview

1. Screw Bit (+) :107
2. Hex Sleeves 5mm
3. Screw Bit (+) :102
4. Hex Sleeves 7mm
5. Tweezers
6. ML500 unit

*\* Before you start: This process is protective level II. Operators should wear electrostatic chains.*

*\* Note: If you need to replace the main board, you have to get into service mode and record the LED usage hour. please refer to section 2-12.*



## 2-2 Disassemble Top Cover Module and Key Pad

1. Unscrew 4 screws on bottom side (as red circle)

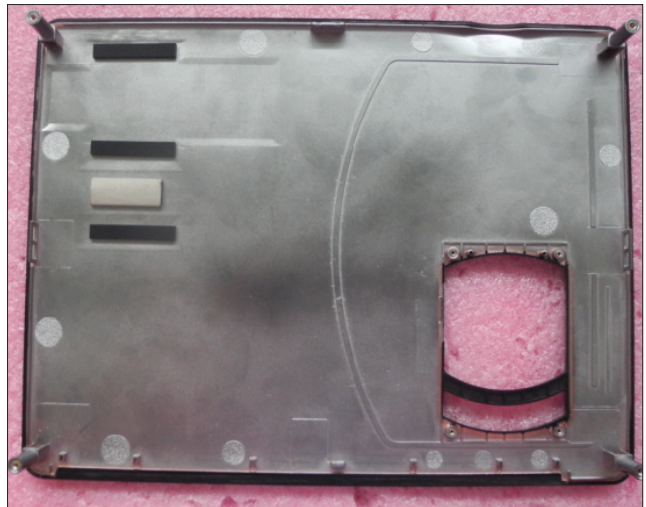


2. Disassemble the Top Cover (as red arrow direct).



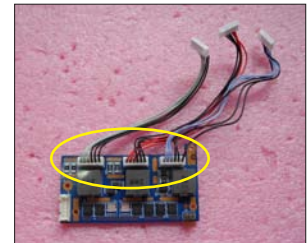
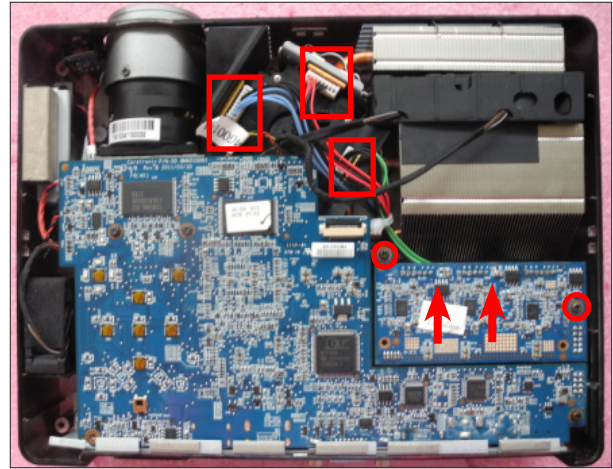
3. Tear off the mylar

4. Separate the keypad and the Top Cover Module.



## 2-3 Disassemble LED Driver Board

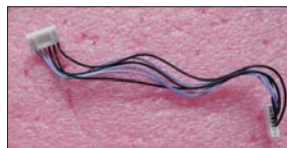
1. Unscrew 2 screws (as red circle)
2. Unplug 3 connectors (as red square)
3. Push the LED Driver Board (as red arrow direct)
4. Unplug 1 connector (as yellow square)
5. Unplug 3 connectors (as yellow circle), disassemble LED to LED Driver Board cable and LED Driver Board.



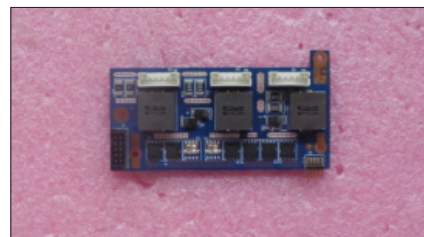
GREEN LED  
CABLE



RED LED  
CABLE



BLUE LED  
CABLE



LED Driver Board

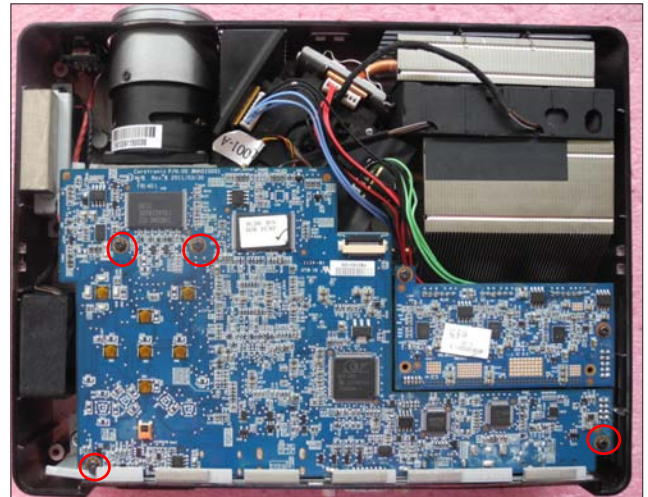


## 2-4 Disassemble Main Board

1. Disassemble 2 hex screws on the rear side(as red circle)



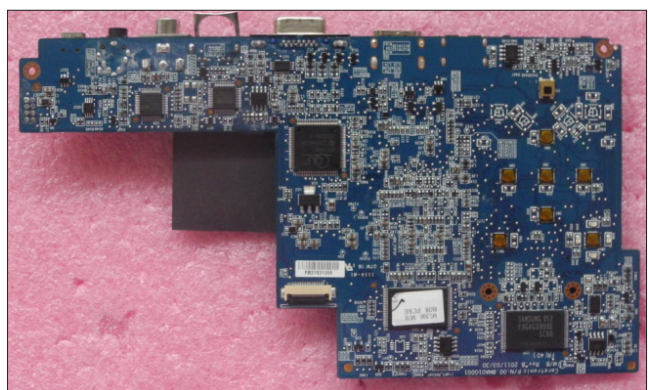
2. Unscrew 4 screws (as red circle)



3. Unplug 7 connectors (as red square)



4. Disassemble Main Board

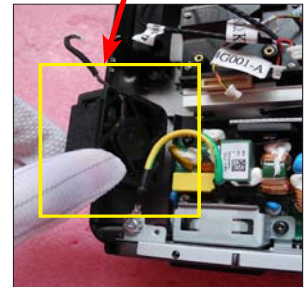
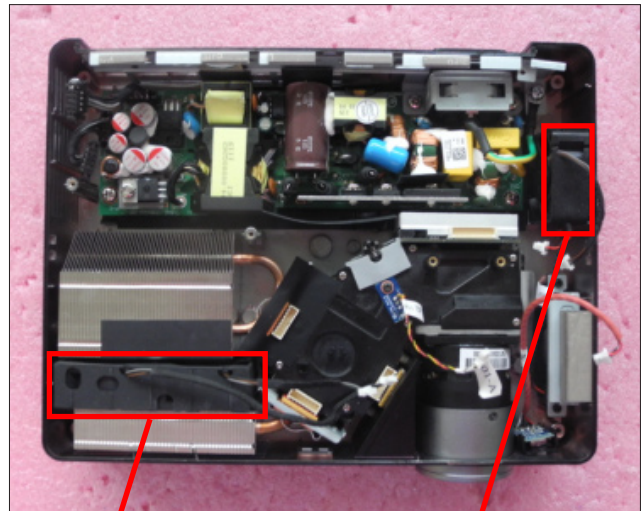


Main Board

## 2-5 Disassemble Fan

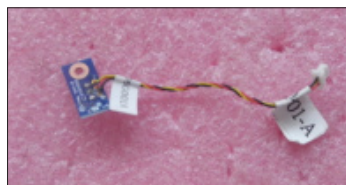
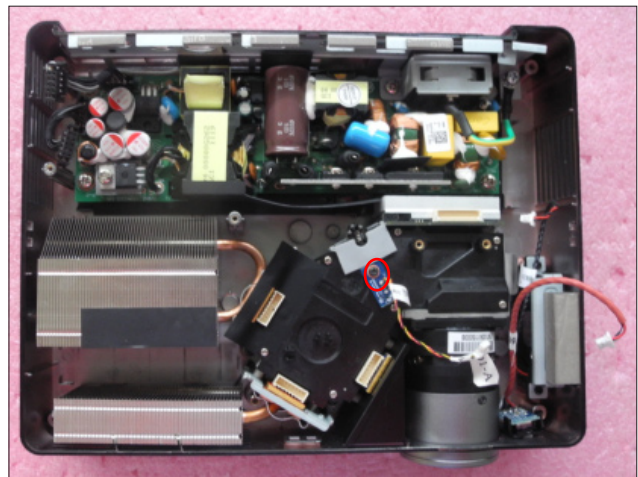
### 1. Take off three Fans

*Note: Care the direction about how to place the fan (as yellow square).*



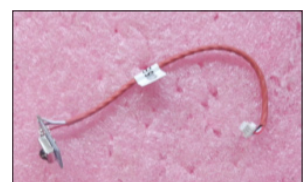
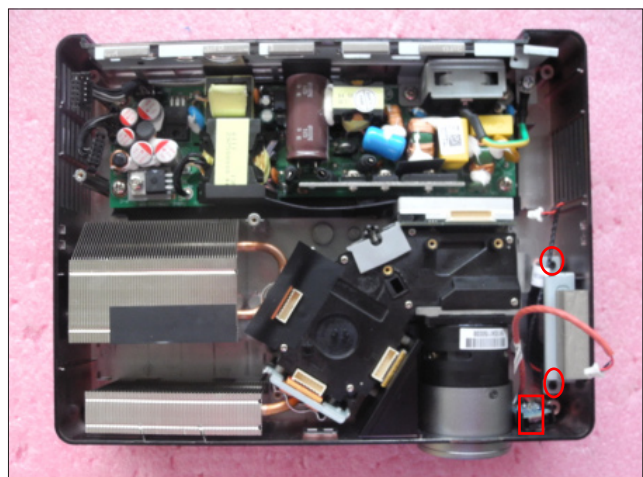
## 2-6 Disassemble Light Sensor Board

1. Unscrew 1 screw to disassemble Light Sensor Board (as red circle)



## 2-7 Disassemble Speaker and IR Board

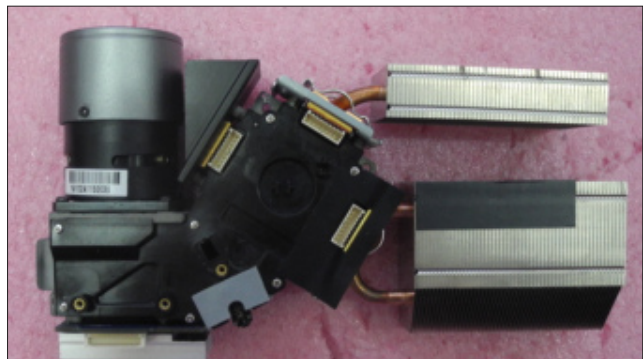
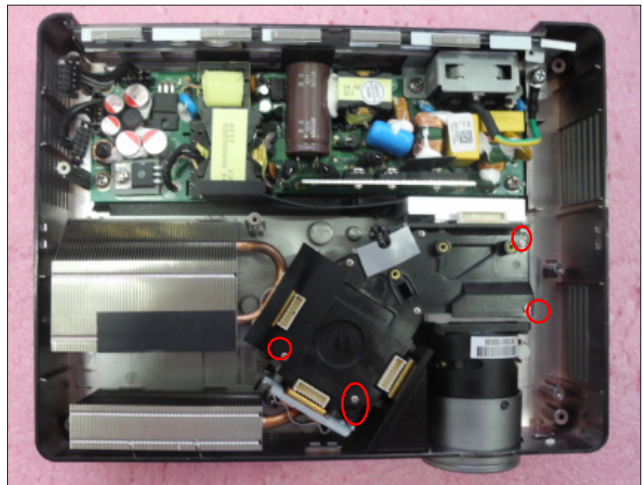
1. Unscrew 2 screws to disassemble speaker (as red circle)
2. Take off IR Board (as red square)



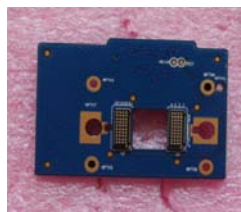
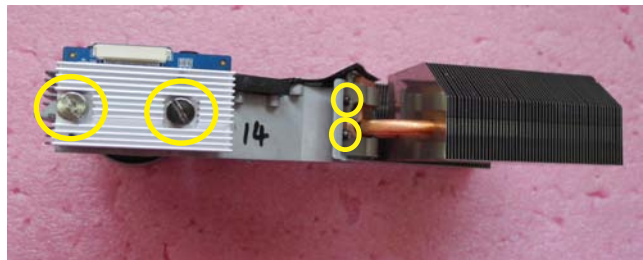


## 2-8 Disassemble Engine Module and LED

1. Unscrew 4 screws to disassemble Engine Module (as red circle)

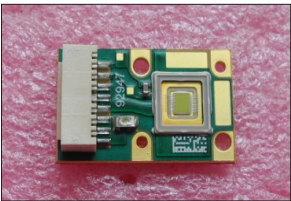


2. Unscrew 4 screws on the rear side of the Engine Module to disassemble DMD Module and Green LED(as yellow circle),

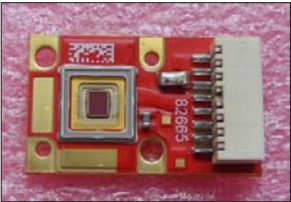
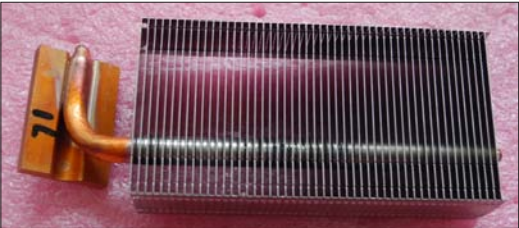
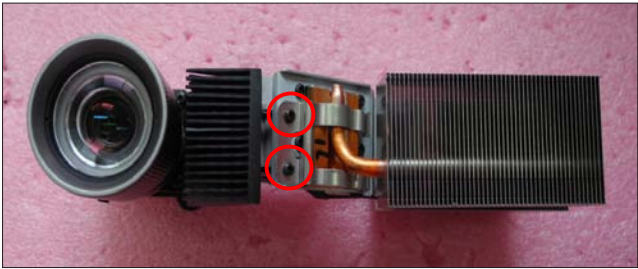


*DMD Board*

3. Disassemble the Green LED.



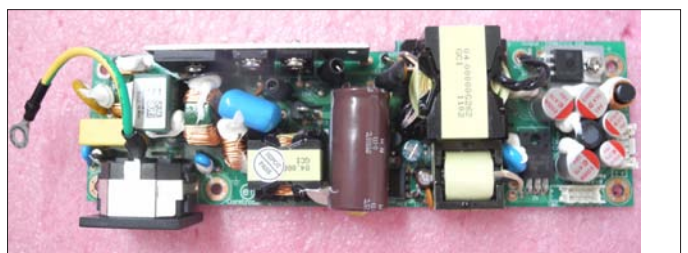
4. Unscrew 2 screws on the front side of the Engine Module to disassemble Red LED(as red circle).



ENGINE MODULE

## 2-9 Disassemble LVPS

1. Unscrew 6 screws (as red circle)
2. Unplug 2 cables (as red square)  
to disassemble LVPS to Main Board  
cable(8 pin) , LVPS to LED Driver  
Board cable(10 pin) and LVPS

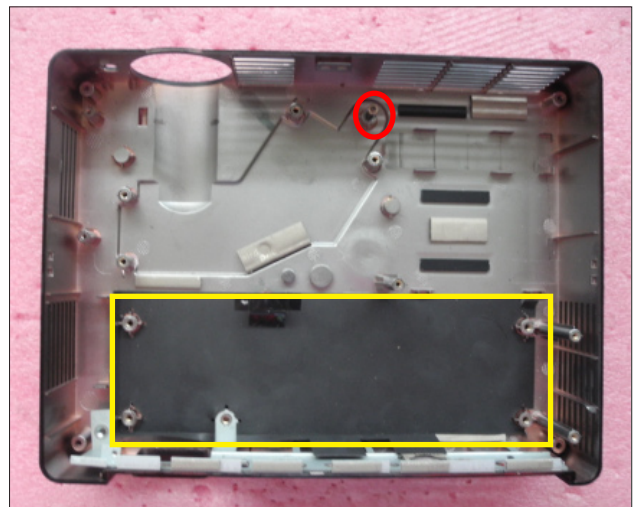


LVPS



## 2-10 Disassemble Bottom Cover Module

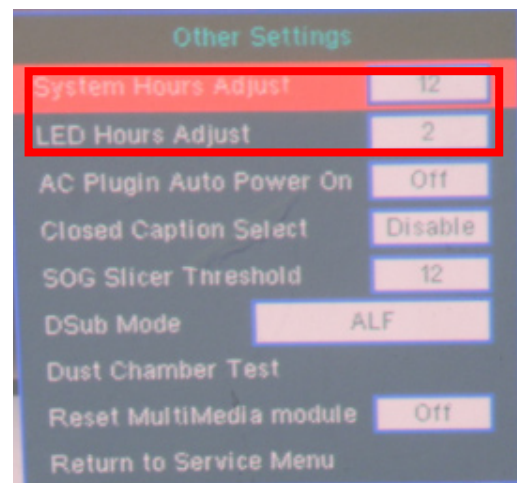
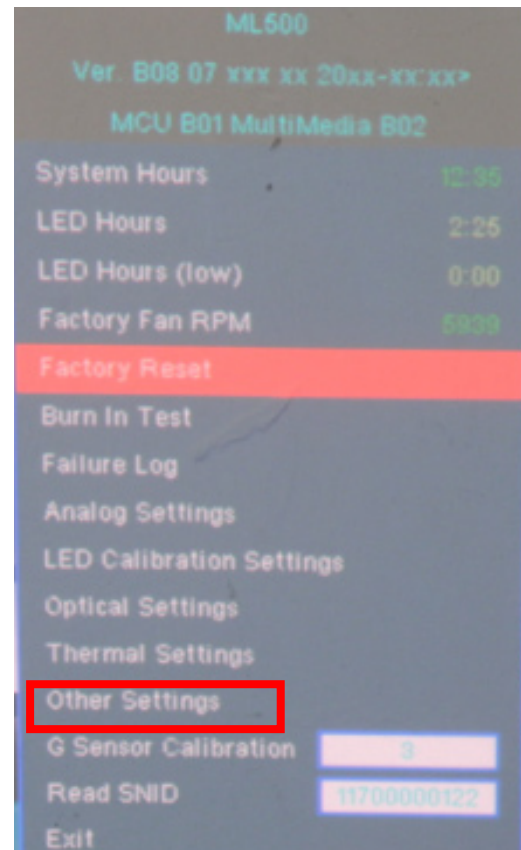
1. Take off Mylar(as yellow square)  
and Unscrew 1 screw (as red circle)  
to disassemble Bottom Cover Module



## 2-11 Re-write LED Usage Hour

1. Get into service mode
  - Press (power→left→left→menu) to get into service mode
2. Choose "Other Settings"(As the red square)
3. Choose "System Hours Adjust" to re-write the usage hour back to previous usage hour
4. Choose "LED Hours Adjust" to re-write the usage hour back to previous usage
5. Choose "Return to Service Menu"
6. Choose Exit

*Note: left key = decrease LED hour  
right key =increase LED hour*



# 2-12 Repair Action

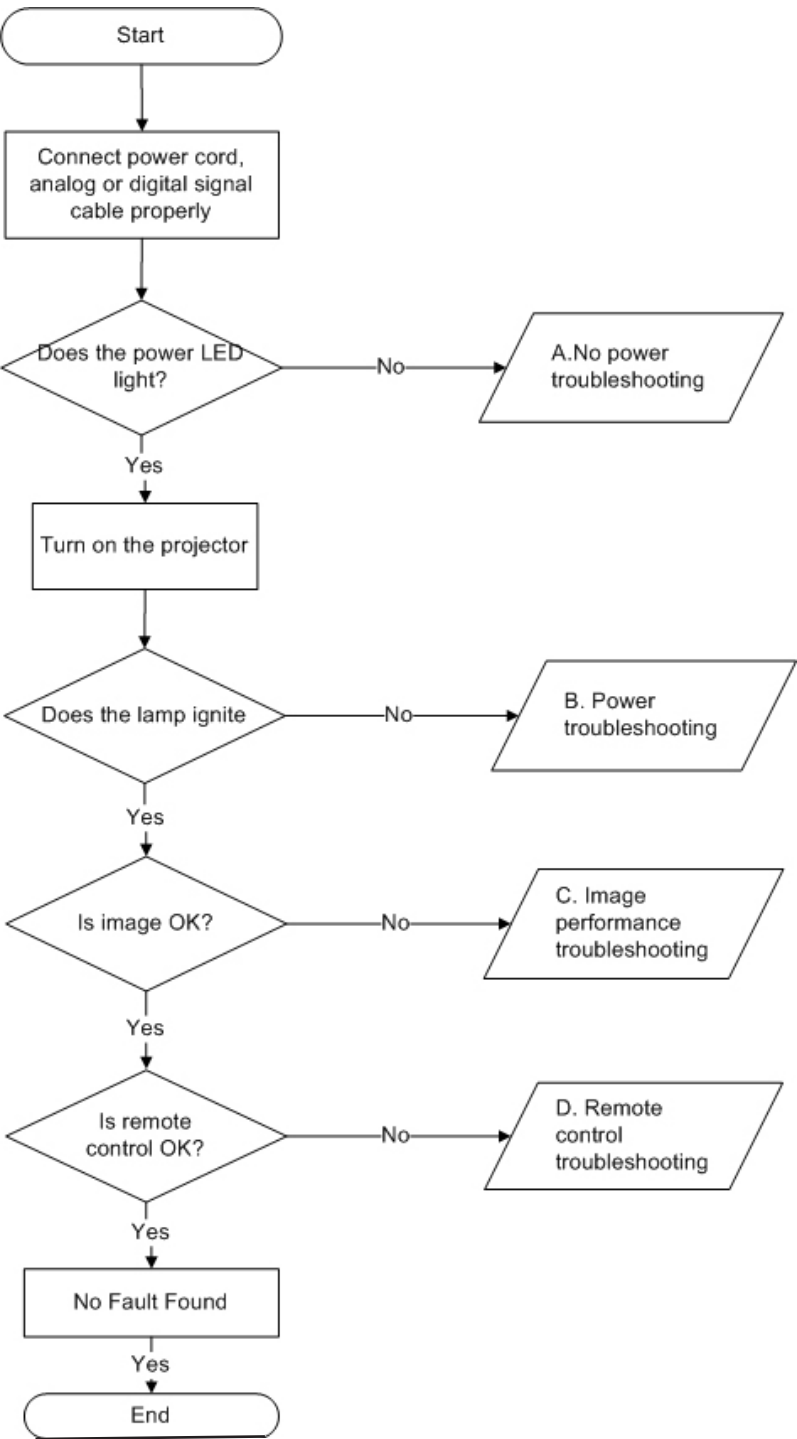
Repair Action	Change Parts				Software		Description page
	Main Board	Engine Module	LED	Fan	Firmware	EDID	
System Firmware Update	V				V	V	Chapter 5 Section 1
PC Calibration	V	V			V	V	Chapter 4-3-7
OSD Reset	V				V	V	Chapter 4-7
EDID	V						Chapter 6
Re-write LED Usage Hour	V						Chapter 2-11
USB Port Test	V				V	V	Chapter 4-3-7
Optical performance Measure		V					Chapter 4-3-1
LED calibration	V	V	V		V		Chapter 4-3-7
G sensor calibration	V				V		Chapter 4-3-7
Fan calibration	V			V			Chapter 4-3-7

# Troubleshooting

## 3-1 LED Lighting Message

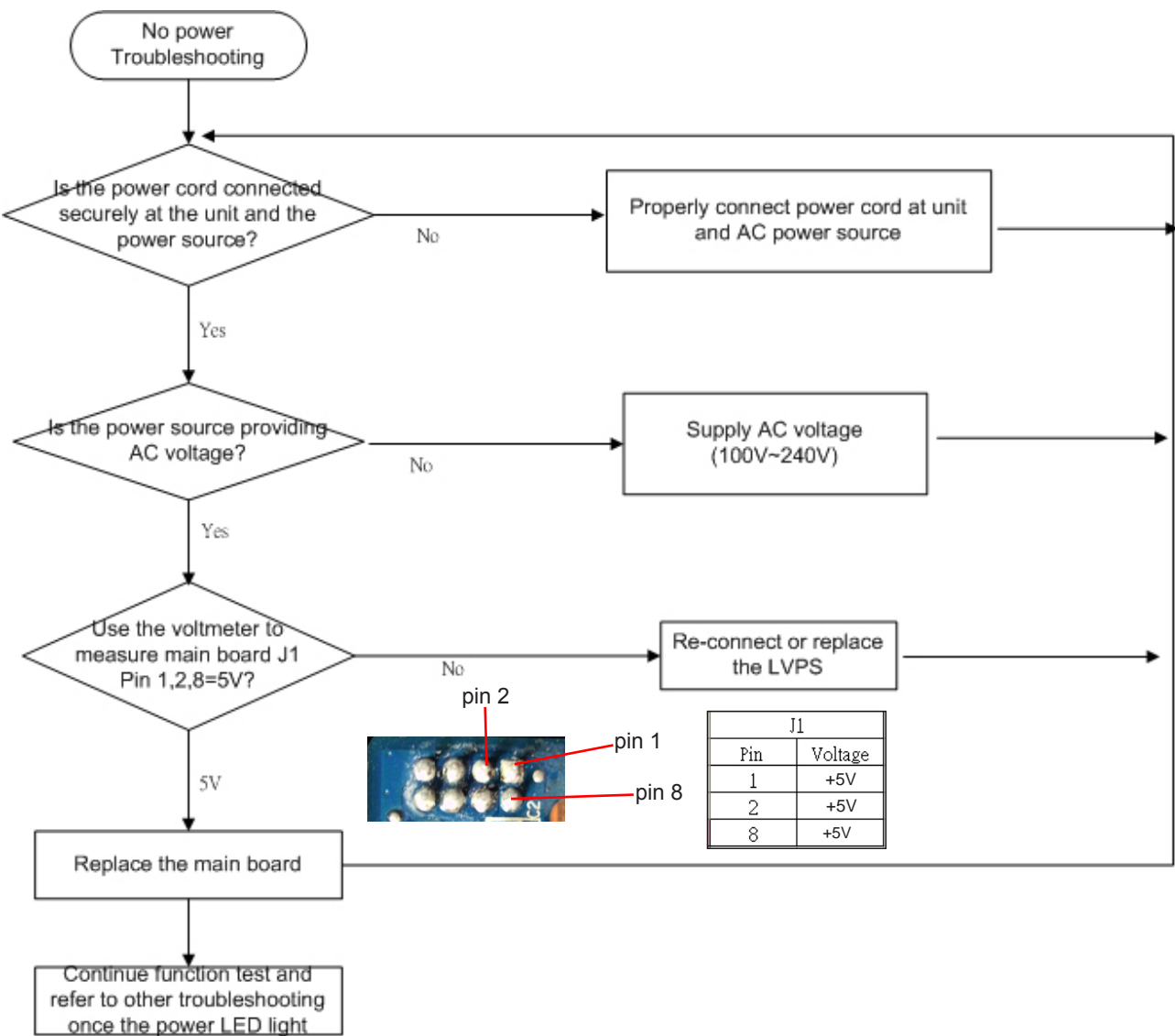
Message	Power_LED	Power_LED
	Red	Blue
Power Plug	ON->OFF->1 second->ON	-
Standby Mode	ON	-
Power button ON	Flash once	ON
Firmware download	ON	ON
Power button ON	Flash once	ON
Power off, Cooling state	0.5 second H(ON), 0.5 second L(OFF) flashing	-
Power button OFF: Cooling completed; Standby Mode	ON	-
Thermal sensor error, OSD shows "Projector Overheated"	-	ON
Fan lock error, OSD shows red "Fan Fail, Will automatically turn off soon"	-	ON

# 3-2 Main Procedure

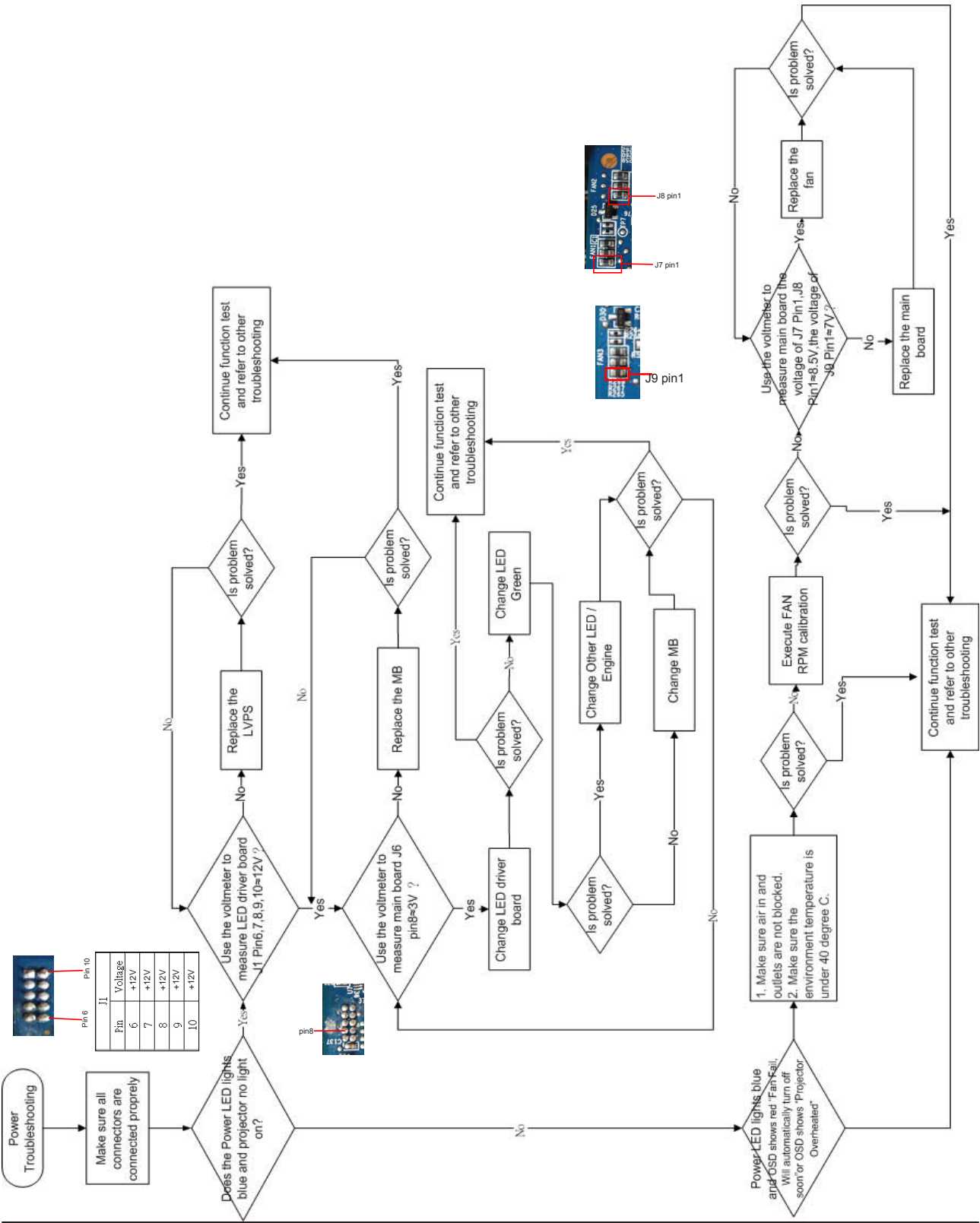




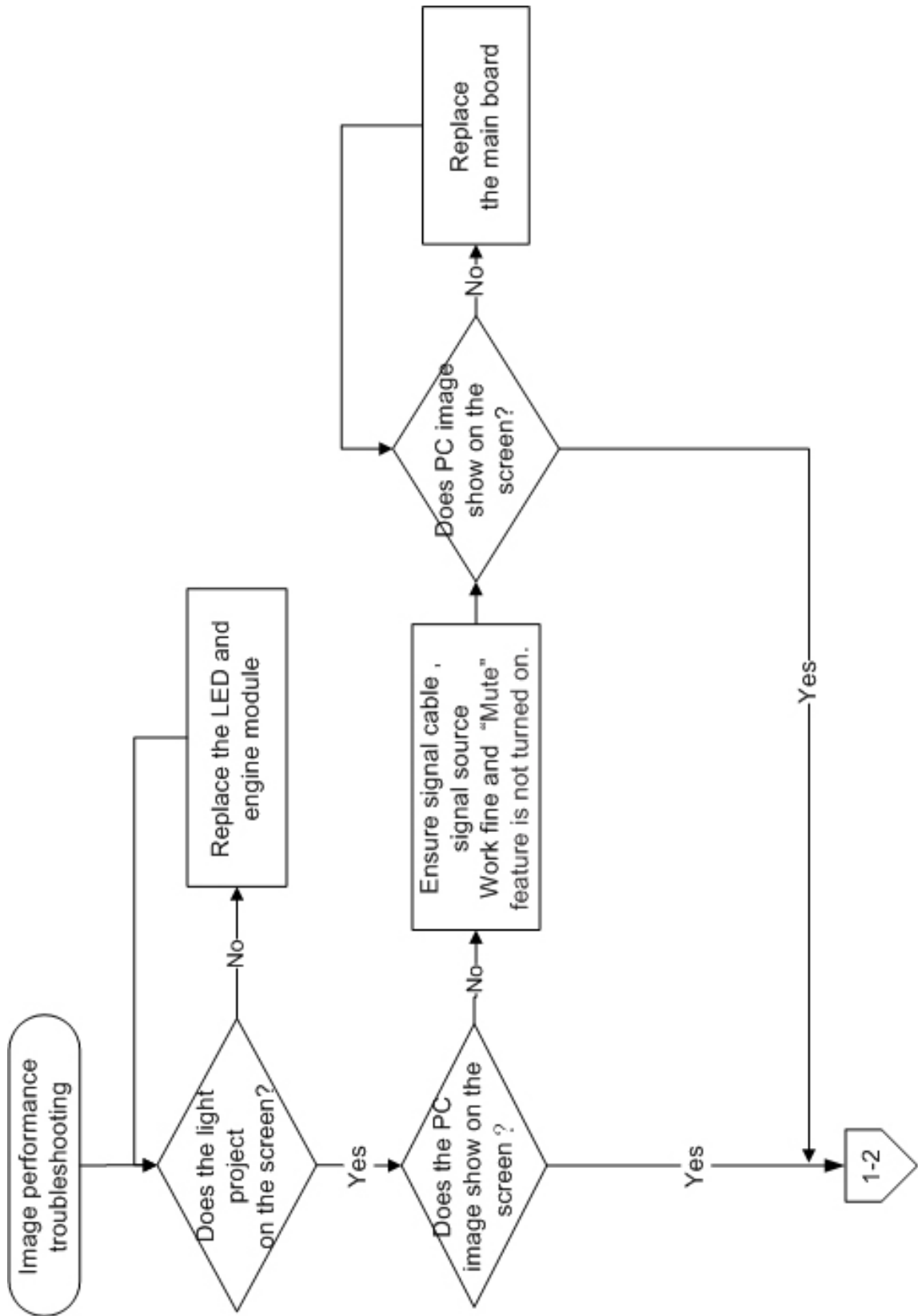
### 3-3 No Power Troubleshooting

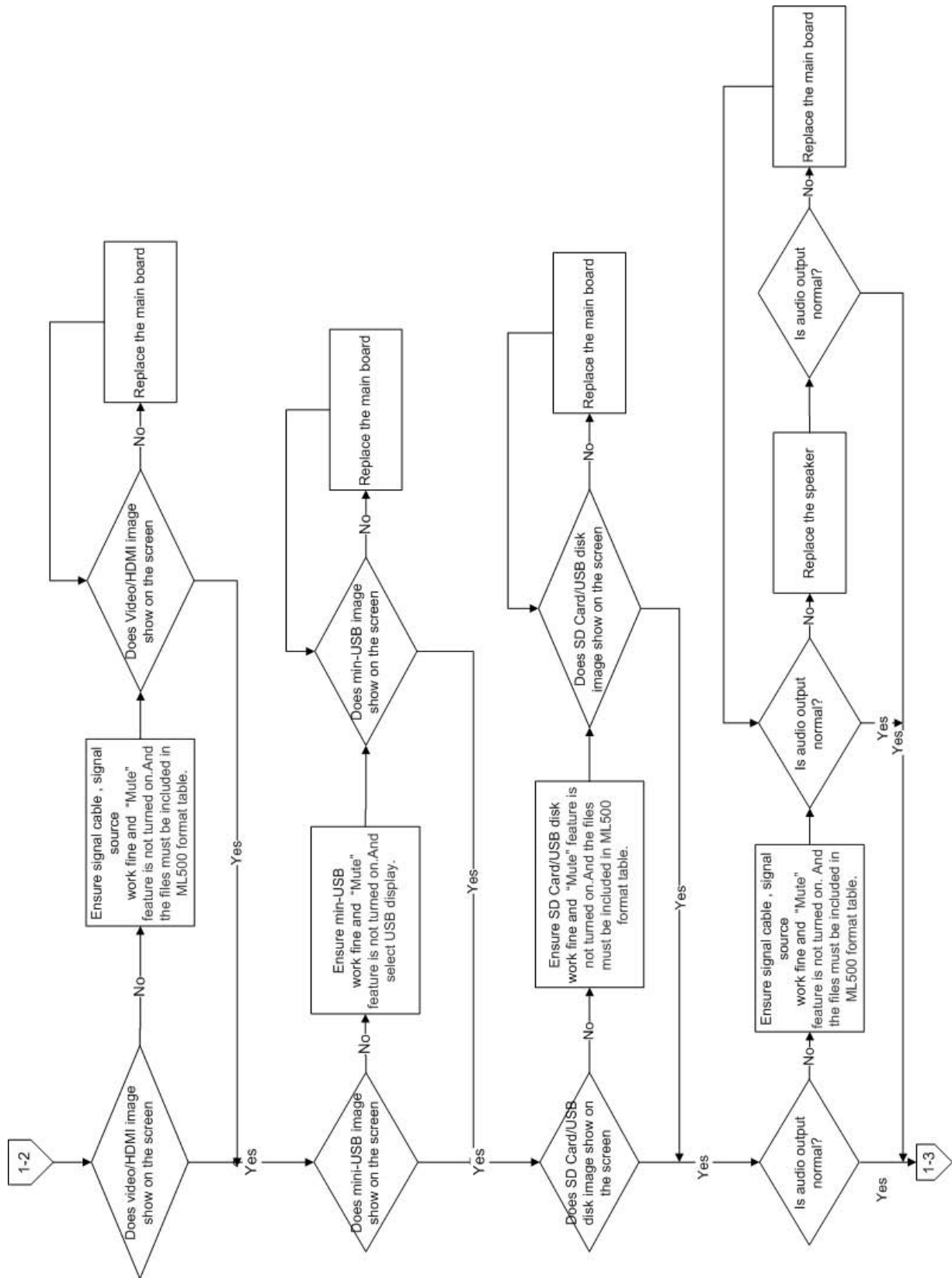


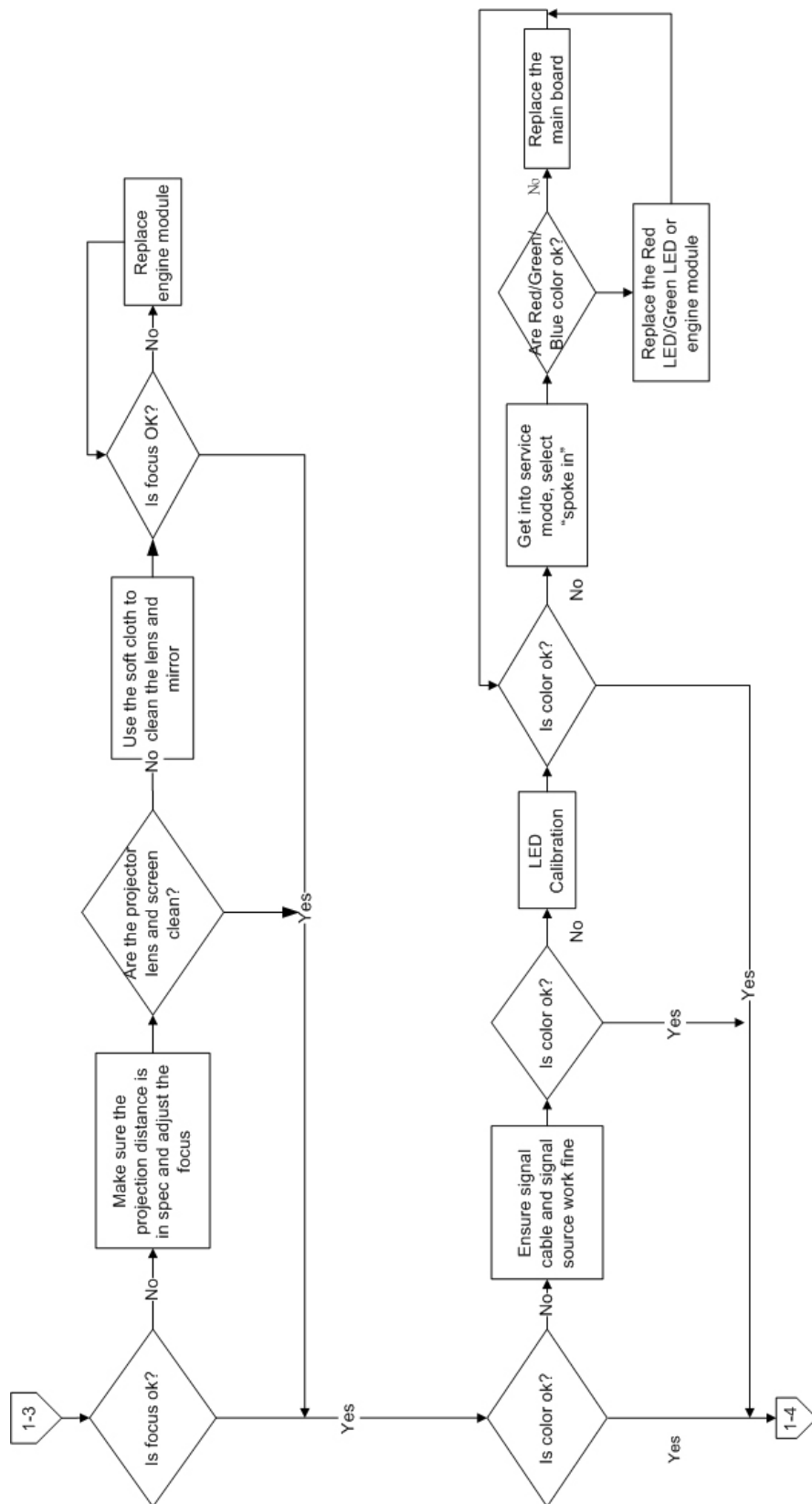
# 3-4 Power Troubleshooting

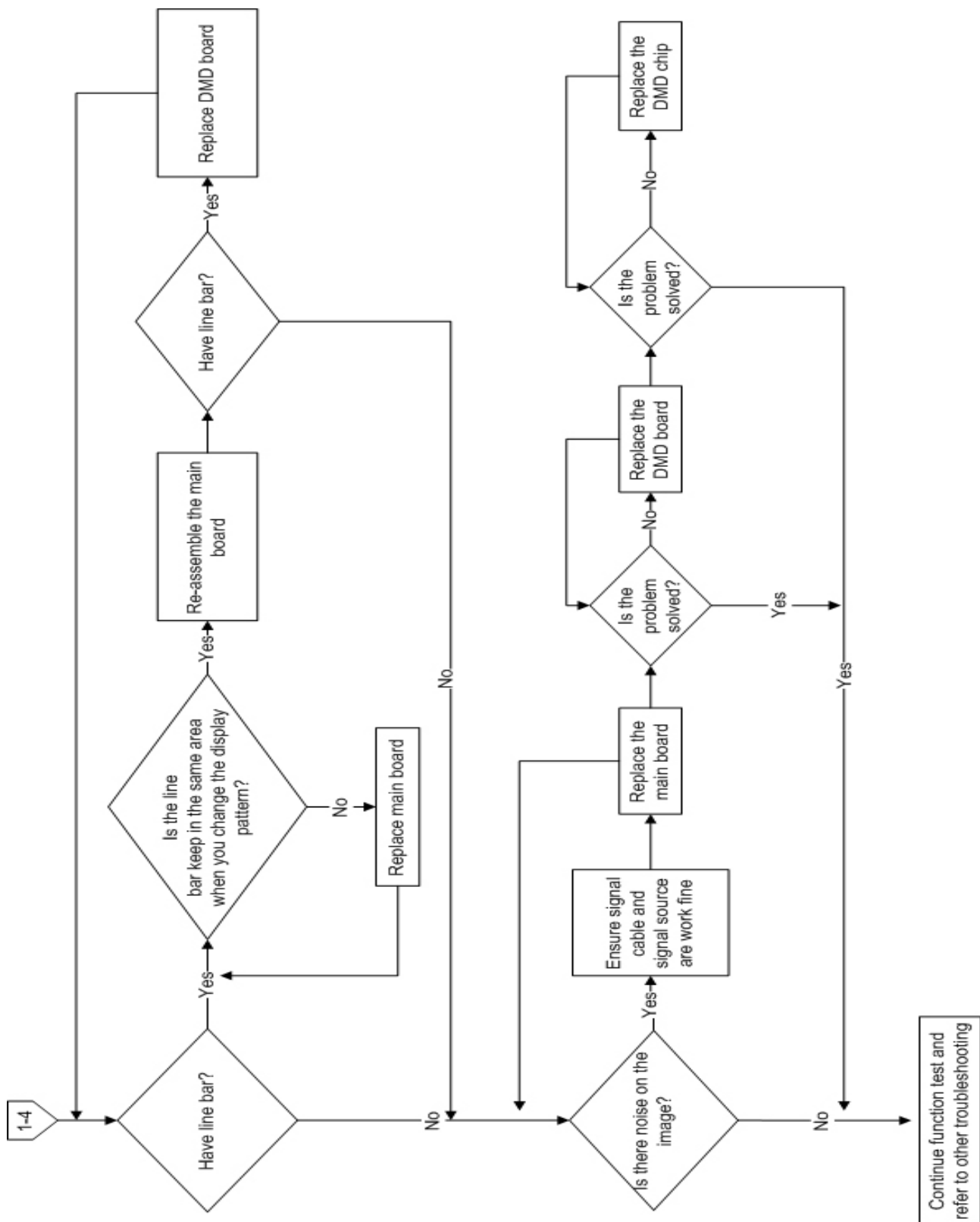


# 3-5 Image Performance Troubleshooting

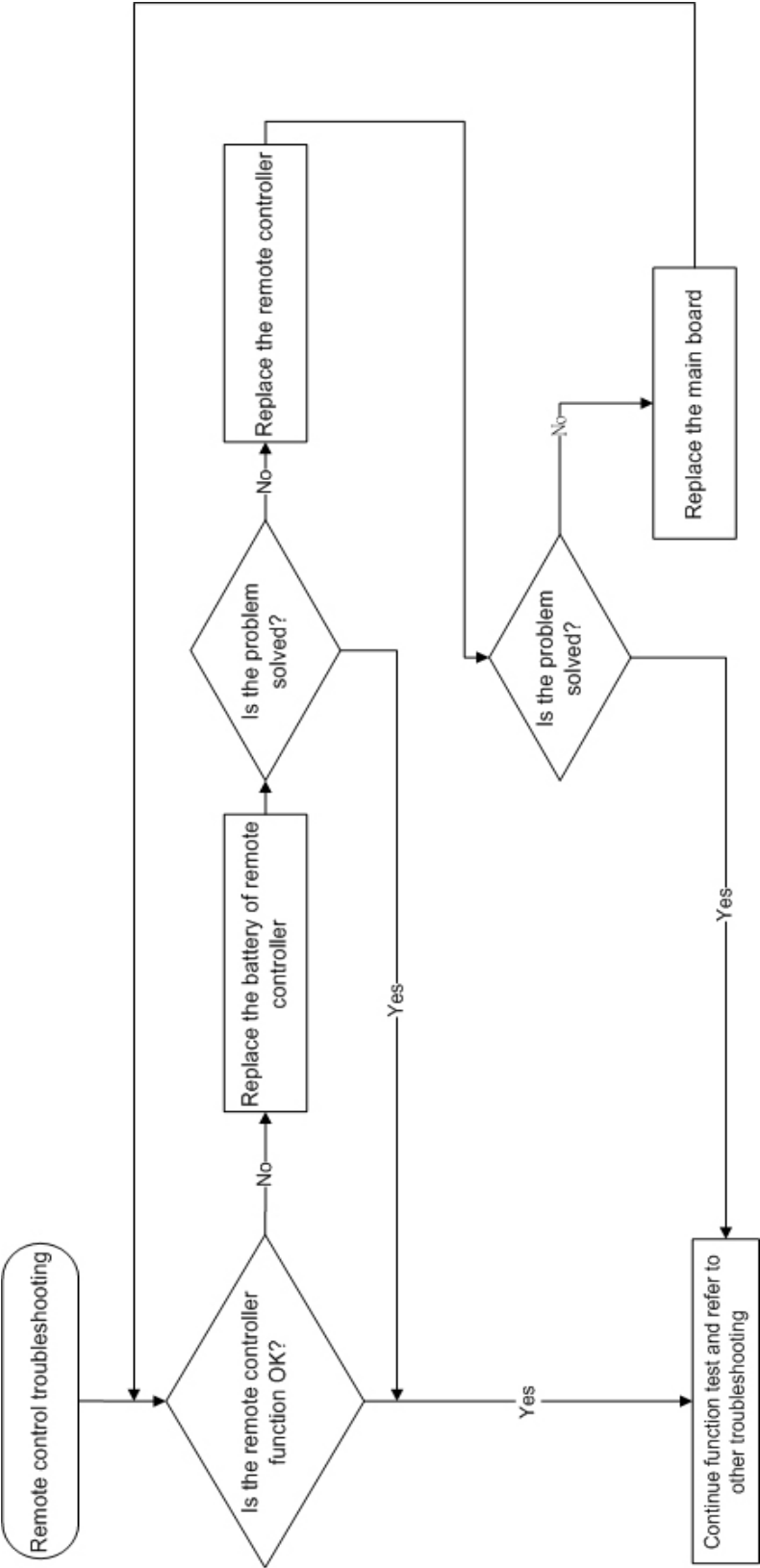








# 3-6 Remote Control Troubleshooting



# Function Test & Alignment Procedure

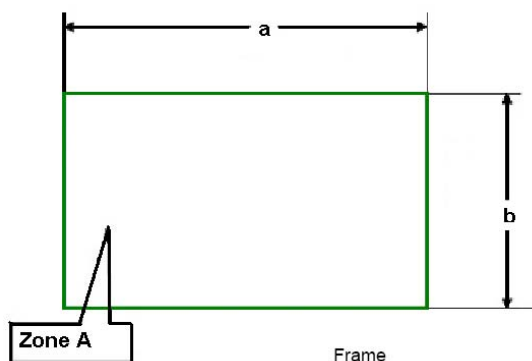
## 4-1 Test Equipment Needed

- PC
- DVD player with Multi-system, equipped "Component", "S-Video", "Composite" and "HDMI".
- HDTV Source (480P, 720P, 1080i, 1080P)
- Minolta CL-200
- Quantum Data 802B or CHROMA2327 (Color Video Signal & Pattern Generator)

## 4-2 Test Condition

- Circumstance brightness: Dark room less than 2.0 lux
- Product must be warmed up for 3 minutes.
- Screen size: 30 inches

### Zone Definition



< Figure: Zone A&Frame (as green line) Definition >



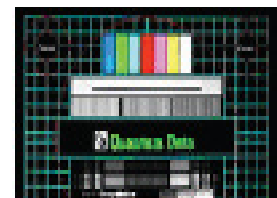
## 4-3 I/O Port Test

### 4-3-1 VGA Port Test

*Note: - When doing function test, get in to service mode, choose "lenstop", press enter, adjust the lens to the highest state and then adjust "Zoom" and "Focus" to guarantee the image maximum and clearest, then start test.*

#### 1. Frequency and Tracking Boundary

Procedure	<ul style="list-style-type: none"><li>- Test equipment: video generator</li><li>- Test signal: 1280*800@60Hz</li><li>- Test Pattern: Master</li><li>- Check and see if the image sharpness is well performed.</li><li>- If not, re-adjust by the following steps:<ul style="list-style-type: none"><li>(1) Select "Frequency" function to adjust the total pixel number of pixel clock in one line period.</li><li>(2) Select "Tracking" function and use right or left arrow key to adjust the value to minimize video flicker.</li></ul></li><li>- Adjust Resync or Frequency/Tracking/H. Position/ V. Position to the inner screen.</li></ul>
Inspection item	<ul style="list-style-type: none"><li>- Eliminate visual wavy noise by Resync, Frequency or Tracking selection.</li><li>- Check if there is noise on the screen.</li><li>- Horizontal and vertical position of the video should be adjustable to the screen frame.</li></ul>



Master

Criteria	<ul style="list-style-type: none"> <li>- If there is noise on the screen, the product is considered as failure product.</li> <li>- If there is noise on the screen, use auto or manual “frequency” function or “tracking” function to adjust the screen.</li> <li>- The PC mode functionally sure be workable include support format with frequency and auto detected functional will be workable.</li> </ul>
----------	---

## 2. Bright Pixel

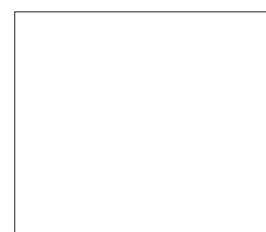
Procedure	<ul style="list-style-type: none"> <li>- Test equipment: video generator</li> <li>- Test signal :1280*800@60Hz</li> <li>- Test Pattern: Full black</li> </ul>
Inspection item	- Bright pixel check
Criteria	<ul style="list-style-type: none"> <li>- Adjacent pixels are unacceptable.</li> <li>- If there is blemish on full black pattern, please use gray 10 pattern to judge it.</li> <li>- Please refer to Pixel specification table.</li> </ul>



*Full Black*

## 3. Dark Pixel

Procedure	<ul style="list-style-type: none"> <li>- Test equipment: video generator</li> <li>- Test signal: 1280*800@60Hz</li> <li>- Test Pattern: Full white</li> </ul>
Inspection item	- Dark pixels check



*Full white*

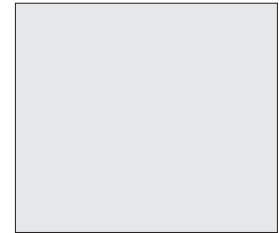
- Criteria
- Adjacent pixels are unacceptable.
  - Please refer to Pixel specification table.

#### 4. Bright Blemish

- Procedure
- Test equipment: video generator
  - Test signal: 1280\*800@60Hz
  - Test Pattern: Gray 10

- Inspection item
- Bright blemish check

- Criteria
- Please refer to Pixel specification table.



*Gray 10*

#### 5. Dark Blemish

- Procedure
- Test equipment: video generator
  - Test signal: 1280\*800@60Hz
  - Test Pattern: Blue 60

- Inspection item
- Dark blemish check.

- Criteria
- The dark blemish should be no more than 10 under blue 60 pattern.
  - Please refer to Pixel specification table.



*Blue 60*

## Pixel specification

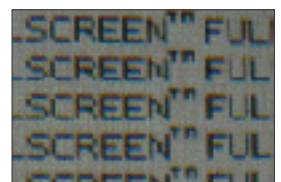
Order	Symptom	Pattern	Criteria
1	Bright pixel ( dots)	Black pattern ( IRE=0)	A=0
2	Dark pixel(dots)	White pattern	A ≤ 1
3	Bright blemish	Gray 10 pattern	A =0
4	Dark Blemish	Blue 60	A =0
5	Bright dot on frame	Black pattern	≤ 1
6	Unstable pixel	White & Black pat- tern	A ≤ 1
7	Adjacent dark pixel	White & Black pat- tern	A = 0

## 6. Focus Test

Procedure	<ul style="list-style-type: none"> <li>- Test equipment: video generator</li> <li>- Test signal: 1280*800@60Hz</li> <li>-Test Pattern: Full screen</li> </ul>
Inspection item	- Focus check
Criteria	<ul style="list-style-type: none"> <li>- From screen 1.0M via visual to check the focus, look at the entire screen, focus shall be clear, crisp, and sharp over the entire surface of the display pattern. (Blur word on one of the corner after adjustment is acceptable. However, the word should at least be recognizable.)</li> </ul>



Full Screen



A OK

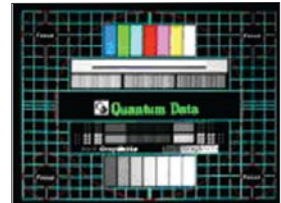


B NG" Poor"

*Note: After adjust the focus , if the screen appear as picture A will be regarded as OK . Otherwise , if the screen appear as picture B will be adjudicated as NG.*

## 7. Color Performance

Procedure	<ul style="list-style-type: none"> <li>- Test equipment: video generator</li> <li>- Test signal: 480p, 720p, 1080p</li> <li>- Test Pattern: Master, 64 gray RGBW or 32GRAYS</li> </ul> <p>*Please get into service mode.</p> <p>Use 720p &amp; 1080p signal, master pattern to do HDTV test. Color should not discolor to purple and blue.</p>
Inspection item	<ul style="list-style-type: none"> <li>- Check if each color level is well-functioned.</li> <li>- Color saturation</li> </ul>
Criteria	<ul style="list-style-type: none"> <li>- Screen appears normal. It should not have any abnormal condition, such as lines appear on the screen and so on.</li> <li>- Color appears normal.</li> <li>- It is unacceptable to have few lines flashing.</li> <li>- RGBW should all appear normal on the screen and sort from R -G-B-W.</li> <li>- Color levels should be sufficient and normal. (The unidentified color levels on both left and right sides should not over 4 color levels.)</li> <li>- Gray level should not have abnormal color or heavy lines.</li> <li>- If color appears abnormal, please get into service mode to do LED Calibration.</li> </ul>



Master



64GRAYS RGBW



32GRAYS

## 4-3-2 Composite Port And Audio Test

Procedure	<ul style="list-style-type: none"><li>- Test equipment: DVD player</li><li>- Test signal: CVBS</li></ul>
Inspection item	<ul style="list-style-type: none"><li>- Video performance test</li></ul>
Inspection Distance	<ul style="list-style-type: none"><li>- 0.8M-1.0M</li></ul>
Criteria	<ul style="list-style-type: none"><li>- Check any abnormal color, line distortion or any noise on the screen.</li><li>- Check if the sound from speaker.</li><li>- Check if "Volume" and "Mute" functions are normal.</li></ul>



*Motion video*

## 4-3-3 S-Video Port Test

Procedure	<ul style="list-style-type: none"><li>- Test equipment: DVD player</li><li>- Test signal: S-Video</li></ul>
Inspection item	<ul style="list-style-type: none"><li>- Video performance test</li></ul>
Inspection Distance	<ul style="list-style-type: none"><li>- 0.8M-1.0M</li></ul>
Criteria	<ul style="list-style-type: none"><li>- Check any abnormal color, line distortion or any noise on the screen.</li></ul>

## 4-3-4 HDMI Port Test

Procedure	<ul style="list-style-type: none"><li>- Test Signal : 720p,1080i</li><li>- Test Pattern : Any Pattern</li><li>- Equipment: DVD Player with HDMI output</li><li>- Display type must be set to 16:9</li></ul>
Inspection item	<ul style="list-style-type: none"><li>- HDMI Test</li></ul>

Inspection Distance - 0.8M -1.0M

Criteria - Ensure the image and sound are well performed and the color should not discolor.

## 4-3-5 3D Test

Procedure - Test equipment: PC with 3D display card, DLP 3D goggles and 3D player software or DVD player.

- Test signal: 3D Format movie (for PC) HQFS format CD (for DVD)

Inspection item - 3D test with 120Hz VGA port (for PC) 3D test with 480i Video (for DVD)

Inspection Distance - 3M-5M

Criteria - The image should not appear noise, flicker.

## 4-3-6 SD Card/ Mini USB/USB flash disk Test

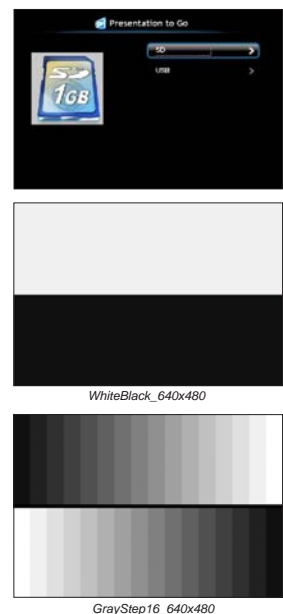
### 1.SD Card Test


Procedure - Test equipment: SD Card (include test pattern)

- Test Pattern: WhiteBlack ,Graystep16, ColorBar

- Turn on the projector and plug SD Card into the projector.

- Select "SD"-->"Photo", play the test pattern in SD Card.



- Press “” button on remote controller when the image is at WhiteBlack test pattern.
- Get into service mode.



## 2.USB flash disk Test

Procedure	<ul style="list-style-type: none"> <li>- Test equipment: USB flash disk(include video file).</li> <li>- Test Pattern: video file.</li> <li>- Turn on the projector and plug USB flash disk into the projector.</li> <li>- Select “USB”--&gt;”Video”, then play video file in USB flash disk.</li> </ul>
Inspection item	<ul style="list-style-type: none"> <li>- Check any abnormal color, any noise on the screen.</li> <li>- Check the sound from speaker.</li> </ul>
Criteria	<ul style="list-style-type: none"> <li>- The video is played smoothly and the voice sounds normal.</li> </ul>

## 3.Mini USB Test

Procedure	<ul style="list-style-type: none"> <li>- Test equipment:Mini USB</li> <li>- Test Pattern: video file.</li> <li>- Turn on the projector and plug Mini USB cable into the projector.</li> <li>- Select “menu”--&gt;”mini USB”--&gt;”USB display”</li> </ul>
Inspection item	<ul style="list-style-type: none"> <li>- Check any abnormal color, any noise on the screen.</li> <li>- Check the sound from speaker.</li> </ul>
Criteria	<ul style="list-style-type: none"> <li>- The video is played smoothly and the voice sounds normal.</li> </ul>



# 4-4 Calibration

## 1.PC Calibration

To adjust the white/black value of VGA signal,after replacing main board or upgrading firmware, the “PC calibration” is needed:

- Procedure
- Test equipment: video generator

- Once Main Board or FW is changed, PC Calibration should be done as well.

(1) Test signal analog: 1280\*800@60Hz

(2) Test Pattern: White (up) Black (down)

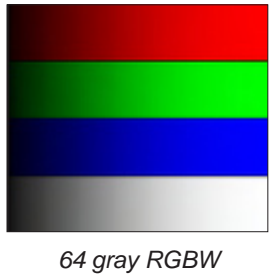


- Note:(1) Calibration pattern should be in full screen mode.
- (2) Please press "Power", "Left", "Left" and "Menu" buttons sequentially to get into Service Mode.
- (3) Choose "Analog Settings", press "Menu" button to access "PC Calibration" for correction. When the message "Success" appears, it means "PC Calibration" is OK. Choose "Exit" to leave the Service Mode.

- Check pattern
- Test signal: 1280\*800@60Hz

- Test pattern: 64 gray RGBW

\* After finishing ADC adjustment, check 64 gray RGBW pattern.



- Inspection item
- Color saturation
- Criteria
- There should not have any lack of RGBW.

The color should appear normal and sort in right order.

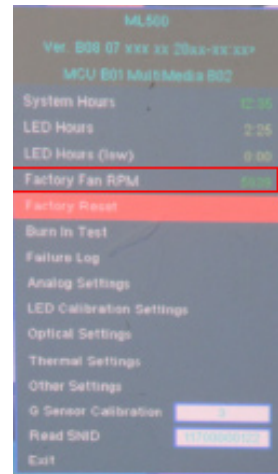
- Color levels should be sufficient and normal.

(the unidentified color levels on both left and right sides should not over 8 color levels.)

## 2. Fan Calibration

To store the value of fan in main board, after replacing main board, blower or upgrading the firmware, the “Fan calibration” is needed:

- Procedure
- Hold on “Menu” button then plug in Power Cord .
  - Power LED will flash red and blue .
  - Release “Menu” button once Power LED flashes red blue only.
  - The Projector will power on.
  - After about 30s, get into Service Mode to check the fan speed has been recorded.



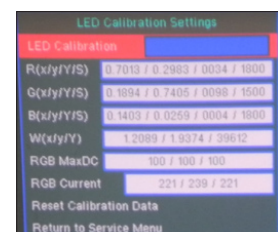
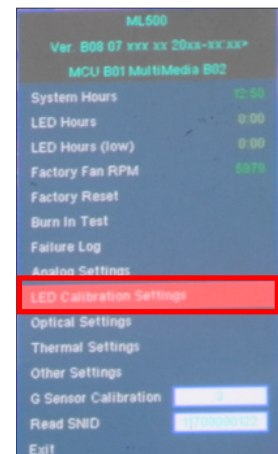
## 3. LED Calibration

*Note: After replacing main board, Engine Module , if the color abnormal, you can do the “LED calibration” .*

- 1.Procedure
- Press “Power”-->“left”--> “left”-->“Menu” to get into Service Mode.
  - Select “LED Calibration Setting”
  - Enter in LED Calibration Settings , and select “Reset Calibration Data”

2.If the color appears abnormal, please execute below procedure:

- Put the CL200 on the center of the screen which
- Put the CL200 on the center of the screen which is about 0.8~1.0m far away from projector
- Connect LED Calibration Fixture and Projector by VGA Cable.



- Connect LED Calibration Fixture and CL200 by CL200 RS232 Cable.
- Connect LED Calibration Fixture and Computer by USB Cable.
- Power on the projector and get into Service Mode.
- Press "LED Calibration Setting"
- Press "LED Calibration" to start calibration and "success" will appear in right blank.



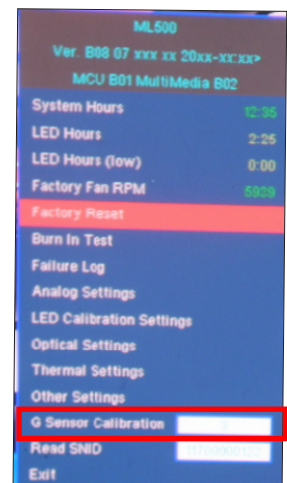
Must be on the center of the screen



#### 4. G Sensor Calibration

To keep the balance of screen, after replacing main board, the "G Sensor calibration" is needed:

- Procedure
- Please put the Projector on a horizontal surface.
  - Please press "Power", "Left", "Left" and "Menu" buttons sequentially to get into Service Mode.
  - Press "G Sensor Calibration" for correction.



#### 4-5 Run In Test

- Temperature: 29°C~35°C
- Circumstance brightness: Normal environment
- Screen size: No concern
- Display mode: ECO mode
- After repairing each unit, it should be Run-in (refer to the below table).

Symptom	Run-in Time
Normal repair	2 hours
NFF	4 hours
Auto shut down	6 hours

- Get into Burn-In Mode

\* Cycle setting is based on the defect symptoms. ie: If it is NFF, the run-in time is 4 hours. You have to set the LED on for 60 min. and LED off for 15 min for 4 cycles.

*Note: Please make sure that the hot exhaust airflows from projectors can flow towards the aisle.*

Press power > Left > Left > menu to get into service mode	
Choose Burn-In Test > enter	
LED On	Press right key to adjust the time (60)
LED Off	Press right key to adjust the time (15)
Set burn in cycle	Press right key to adjust the cycle
After setting up the time, choose "Get into Burn-In Mode" and press enter	

## 4-6 Test Inspection Procedure

### 1. Check Points

Check item	Check point
Firmware version	All firmware version must be the latest version
TB implementation	Related TB must be implemented
Cosmetic	Cosmetic can not be broken
Logo	Missing logo, missing prints and blurry prints are unacceptable
Zoom in/out	The function should work smoothly
Keypad	All keypad buttons must operate smoothly

## 2.OSD Reset

After final QC step, we have to erase all saved change again and restore the OSD default setting. The following actions will allow you to erase all end-users' settings and restore the default setting:

- (1) Please get into OSD menu.
- (2) To execute "Reset" function.

# Firmware Upgrade

---

## Section 1: System Firmware Upgrade

### 5-1-1 Equipment Needed

**Software : (DDP6401-USB)**

- DLP Composer Lite v10.5
- Firmware (\*.img)
- library (ML500 library)

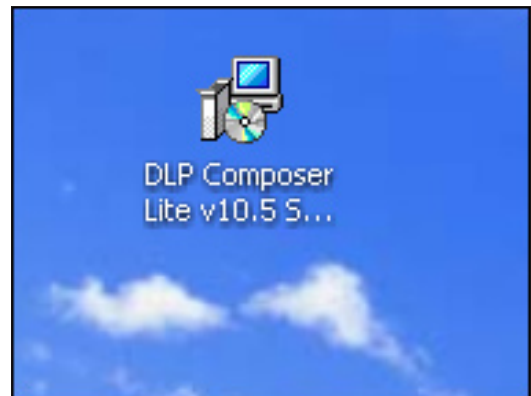
**Hardware :**

- Projector
- Power Cord
- USB Cable mini USB to USB (A) (42.00284G001)
- PC or Laptop



## 5-1-2 DLP Composer Lite Setup Procedure

1. Choose "DLP Composer Lite V10.5 Setup" Program.

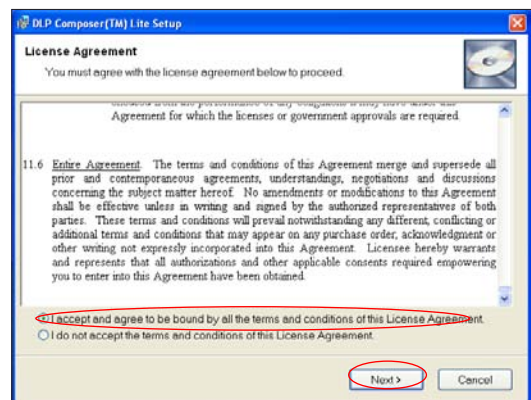


2. Click Next button.

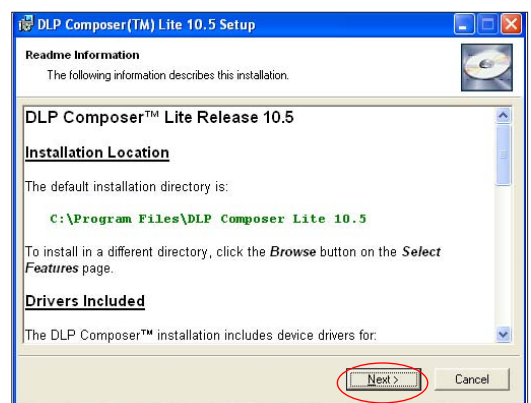


3. Read License Agreement.

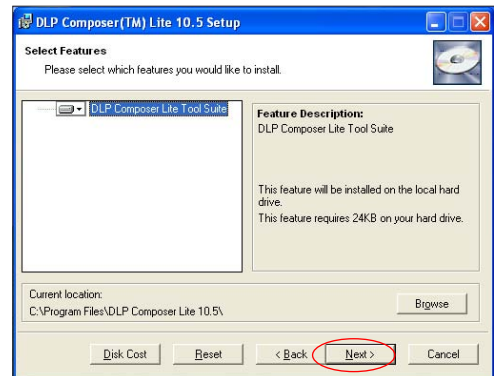
- Choose "I accept and agree to be bound by all the terms and conditions of this License Agreement".
- Click Next.



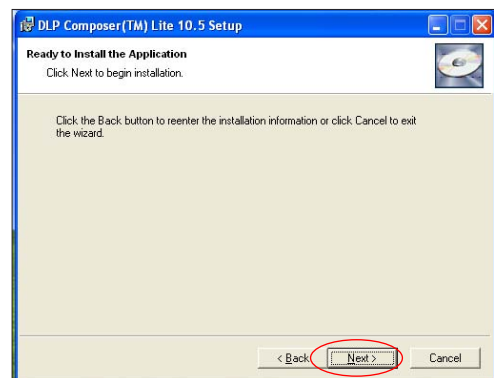
4. Click "Next".



5. Click Next.

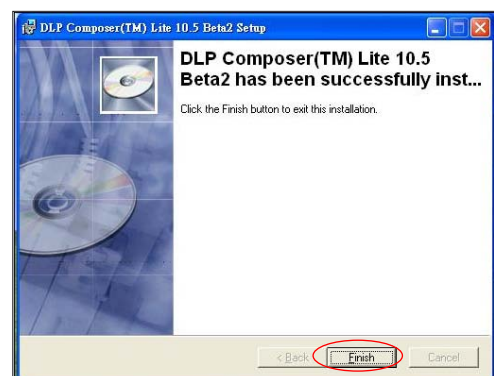


6. Click Next.



7. Click Finish.

8. Restart the computer.





## 5-1-3 Firmware Upgrade Procedure

### 1. Set-up

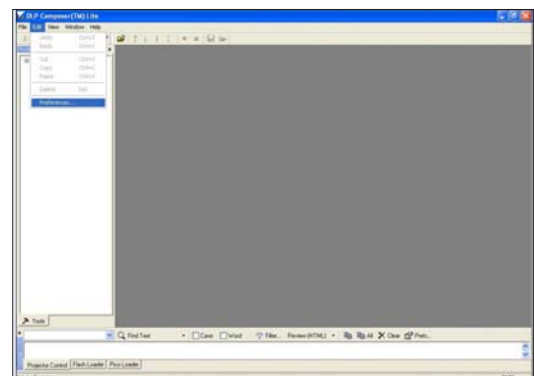
- Hold on "Power" and "menu" and plug in Power Cord to get into FW Download Mode.
- Once Power LED show pink light, this time for FW upgrade mode.
- Insert Mini-USB Cable (USB A to Mini B) to ML500&PC



### 2. Execute the DLP Compose file.

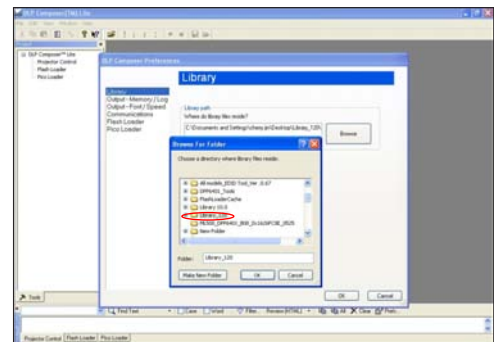


### 3. Click "edit" and "perferences".

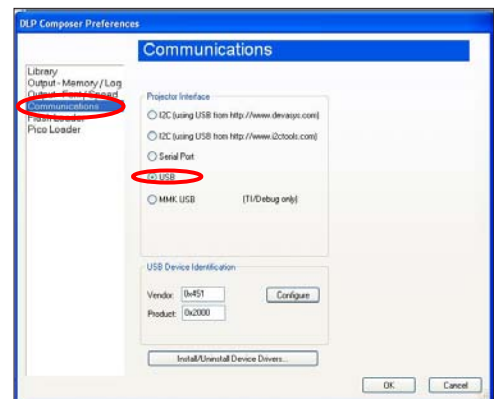


4. Click "Library."

- Click the "browse" button and navigate to the directory where you put the library file in.

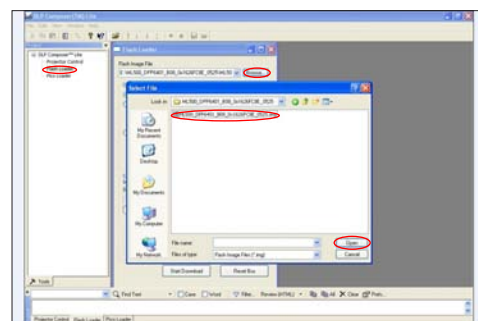


5. Click "Communications ",then select "USB"



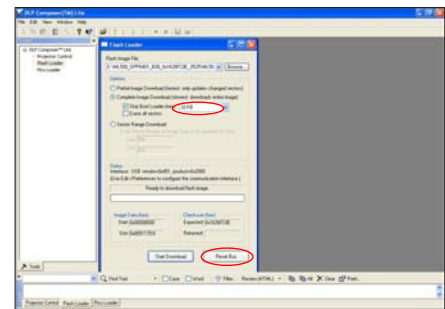
6. Choose "Flash Loader".

- Click "Browse" to search the firmware file (\*.img).
- Click "Open"



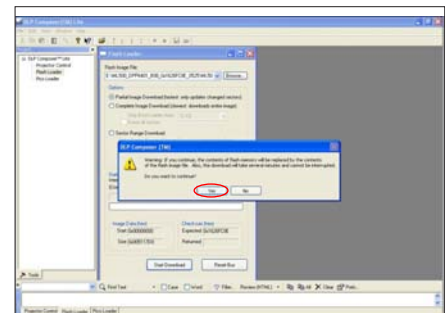
7. Selete the item skip Boot Loader Area

- Select "32KB".
- Click Reset Bus to erase the flash memory.

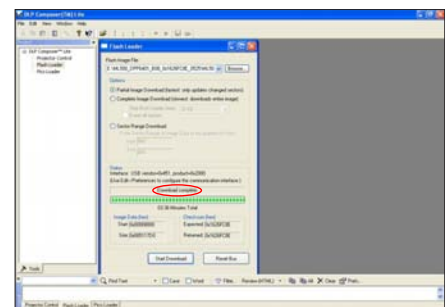


8. If the firmware is ready, click start download to process the firmware upgrade.

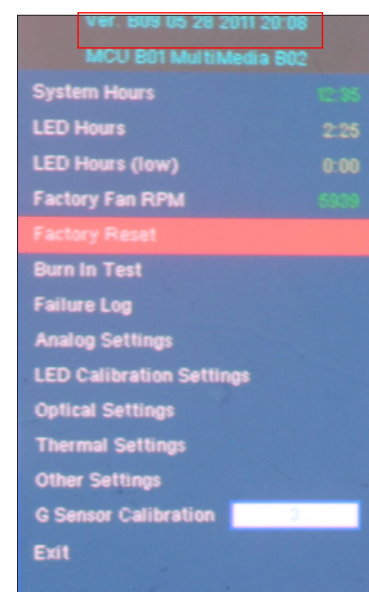
- Click "Yes" to erase the flash memory.



9. When firmware upgrade process is finished, "Download Complete" will appear.



10. Re-plug in power cord and Power on the projector. Get into the service mode (power--left--left--menu) to check the firmware version.



# Section 2 : Multimedia FW Upgrade(USB)

## 5-2-1 Equipment Needed

### Software :

- Firmware (\*.Bin)
- Tools

### Hardware :

- Projector
- Power cord (42.53506G002)
- **USB Cable (male to male)(42.0028JG001)**
- PC or Laptop

*Note:After upgrade the multimedia FW, the files of the projector will be cleared.*



## 5-2-2 USB Driver Upgrade Procedure

### 1. Set up

- Hold on "Power" and "menu" and plug in Power Cord to get into FW Download Mode. Once Power LED lights pink, then release "Power" and "menu" button.
- Plug in USB cable into the projector and link to the USB port of a PC.



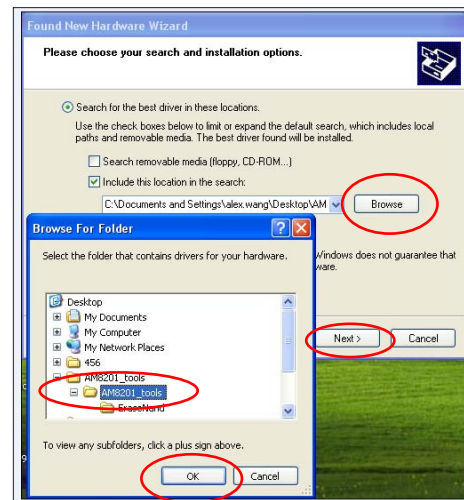
### 2. Execute Program

- 1) Found new hardware wizard will appear on the screen.
  - Select "Install from a list or specific location (Advanced)"
  - Then click Next.
- 2) Select "Include this location in the search"



3) Click "Browse" button to choose "tools".

- Select "OK".
- Then click Next.



4) Click "Continue Anyway".

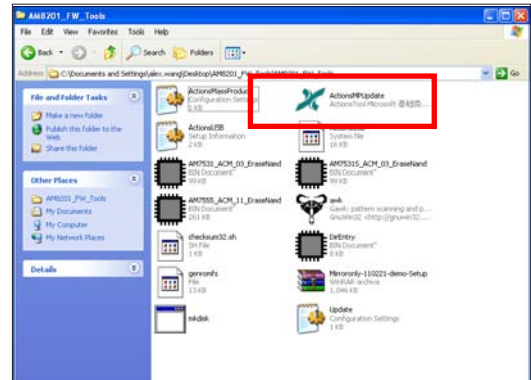


5) Click "Finish" to end the installation.

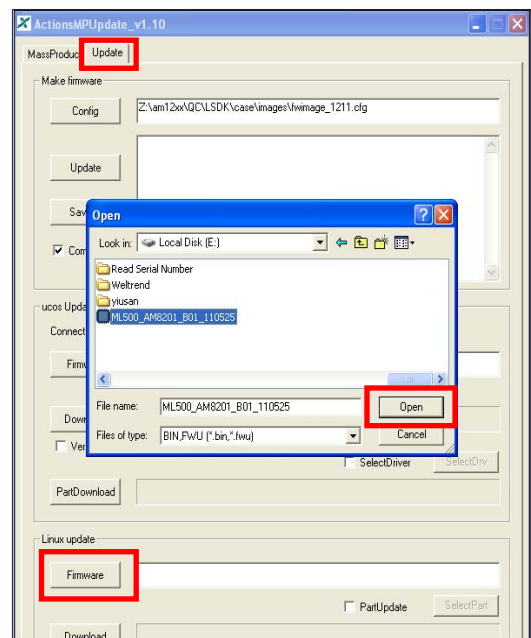


## 5-2-3 Multi-Media Firmware Upgrade Procedure

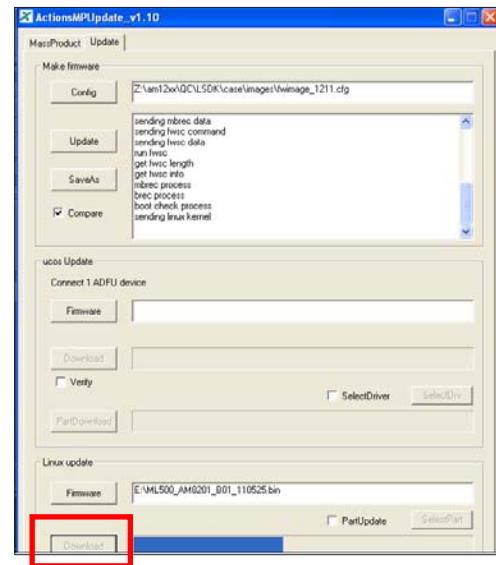
1. - Open "tools" file,  
- Execute "Actions MP Update.exe".



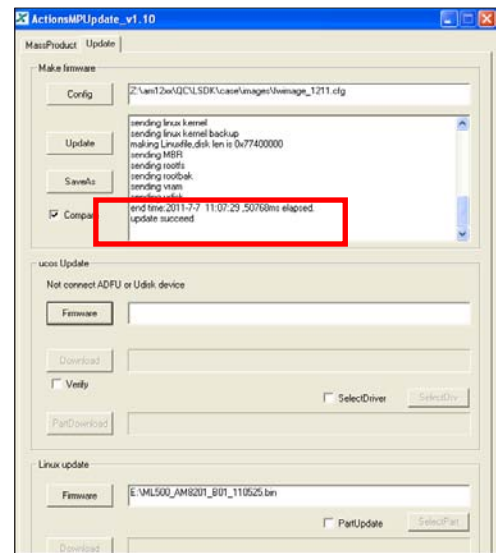
2. - Click "Firmware",
  - Select the FW upgrade file(\*.bin),
  - Click "Open".



3. Click “Download.”

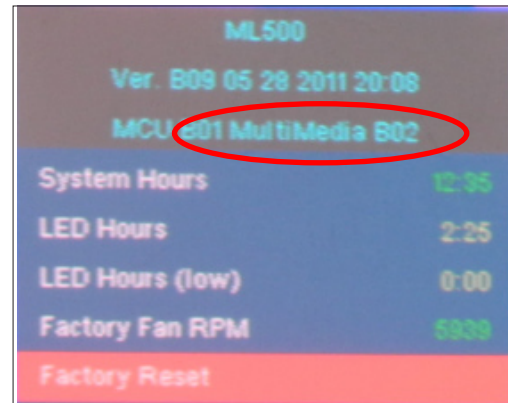


4. The success information will show on screen.





5. Restart the unit and enter the service mode to check the Multi-Media firmware version.



# Section3:Multimedia FW Upgrade (SD Card)

## 5-3-1 Equipment Needed

### Software :

- Firmware (\*.Bin)
- Tools

### Hardware :

- Projector
- Power cord (42.53506G002)
- PC or Laptop
- Card Reader
- SD Card

*Note:After upgrade the multimedia FW, the files of the projector will be cleared.*



## 5-3-2 Multi-Media Firmware Upgrade Procedure

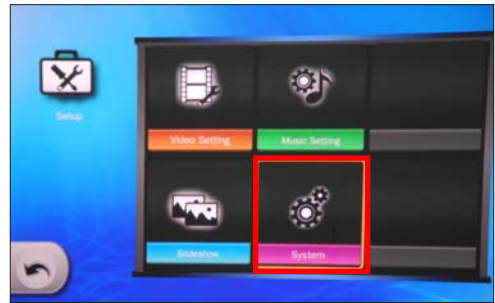
1. Rename multimedia software file name to "ACTUPGRADE.BIN".
2. Copy the file to SD card by PC.
3. Insert SD card to projector.



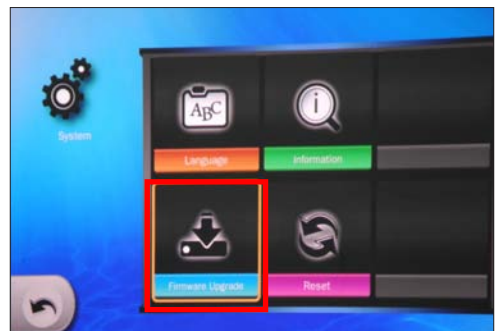
4. Choose "Setup"



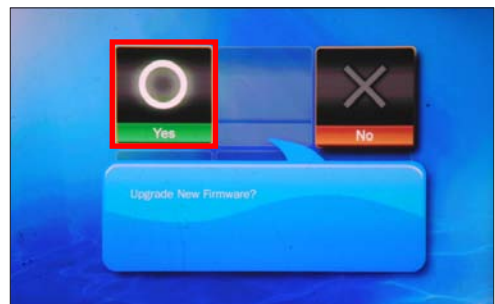
5.Choose "System"



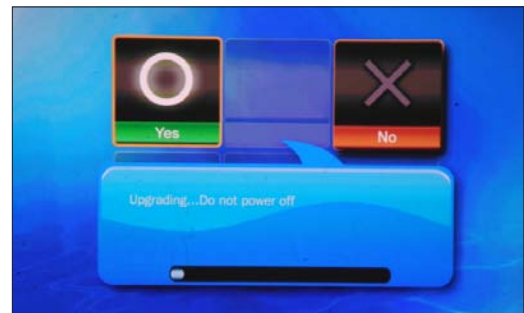
6.Choose"Firmware Upgrade"



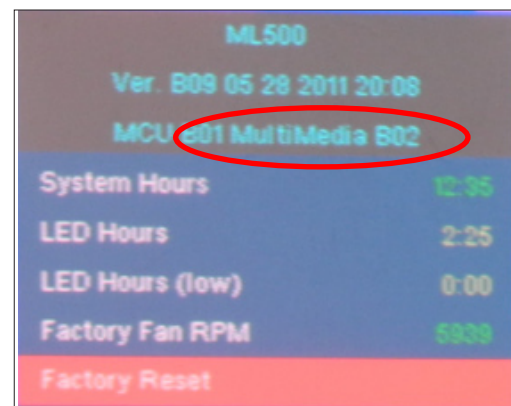
7.Choose "Yes" to process FW Upgrade .



8. Firmware upgrade procedure image will appear as the right picture shown.



9. Restart the unit and enter the service mode to check the Multi-Media firmware version.



# Section 4: 8051 FW Upgrade

## 5-4-1 Equipment Needed

### Software: (N79A901R-USB)

- Setup \_NLINK\_en
- Manley USB Driver\_NLINK
- xxx\_8051\_xx.hex

### Hardware:

- Projector
- Power cord: 42.50115G001
- USB Cable mini USB to USB (A) (42.00284 G001)
- NLINK Fixture
- PC or Laptop



## 5-4-2 8051 Firmware Upgrade Procedure

### 1. Set-up

- Plug in USB cable into the projector and link to the USB port of a PC
- Connect VGA Port of projector with NLINK Fixture.
- Connect NLINK Fixture with PC by USB cable.

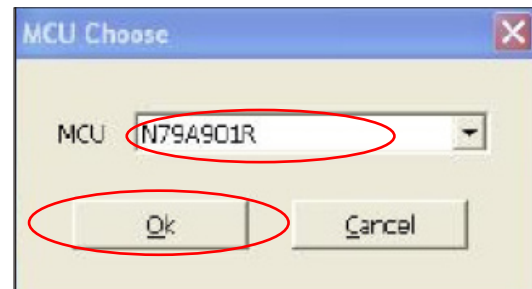


### 2. Execute 8051 FW Program

- Double click "NLINK V1.2" to execute NLINK program.

### 3. Choose the right type of MCU

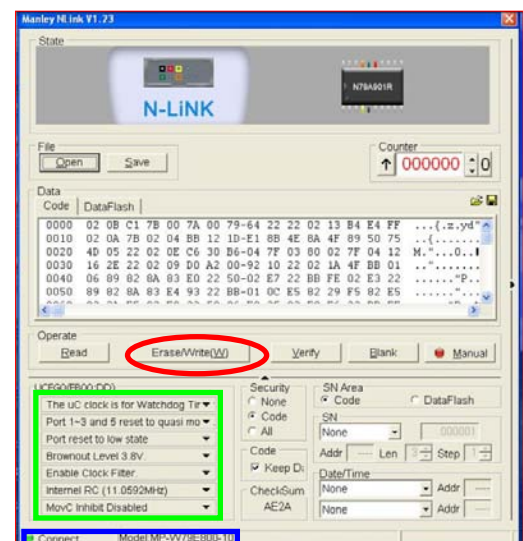
- "MCU Choose" picture will appear on the screen, select "N79A901R."
- Click "OK".



### 4. Program settings

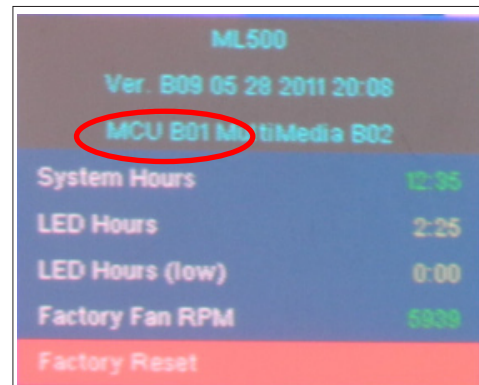
Ensure NLINK Fixture and PC are securely connected: the indicator lights on green, and the state is "Connect" (as blue square).

- Select "Brownout Level 3.8V" (as green square).
- Select "Internal RC(11.0592MHz)" (as green square).
- Click "Erase/Write(W)" to execute 8051 FW upgrade (as red circle).



### 5-4-3 Check 8051 FW version

1. Restart the unit and enter the Service Mode  
(Press Power --> Left --> Left--> Menu).
2. The firmware version will be shown as red circle on the screen.





# EDID Upgrade

---

## 6-1 EDID Introduction

Extended Display Identification Data is a VESA standard data format that contains basic information about a display device and its capabilities, including vendor information, maximum image size, color characteristics, factory pre-set timings, frequency range limits, and character strings for the monitor name and serial number.

The information is stored in the display and is used to communicate with the system through a Display Data Channel (DDC), which sits between the display device and the PC graphics adapter. The system uses this information for configuration purposes, so the monitor and system can work together.

*Note: If a display device has digital input ports, like DVI or HDMI, but without EDID in its main board, the display device will show no image while the input source is digital signal.*

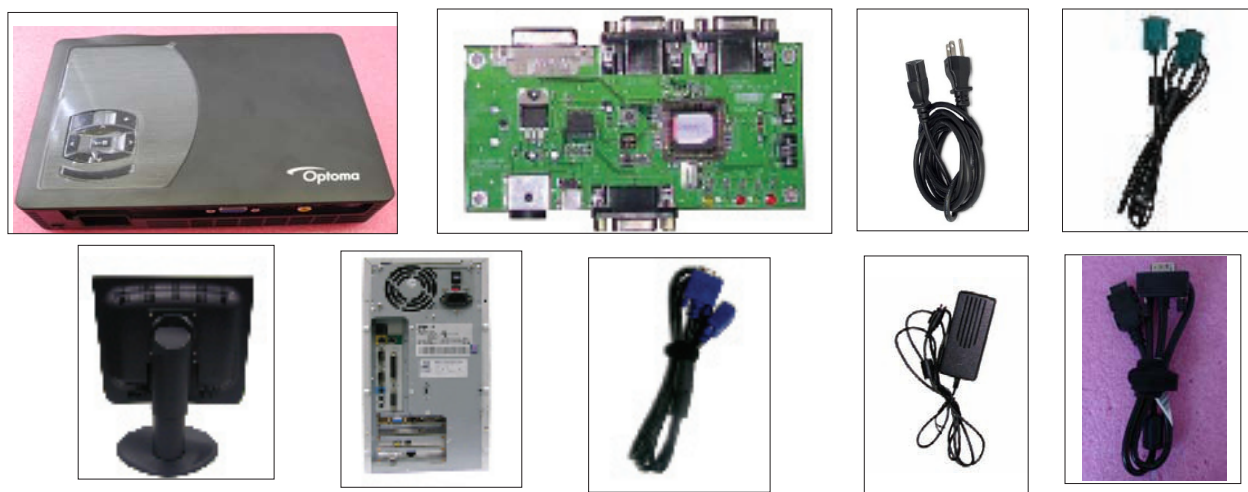
# 6-2 Equipment Needed

## Software

- EDID Program (Generic V0.81)
- EDID File (\*.ini)

## Hardware

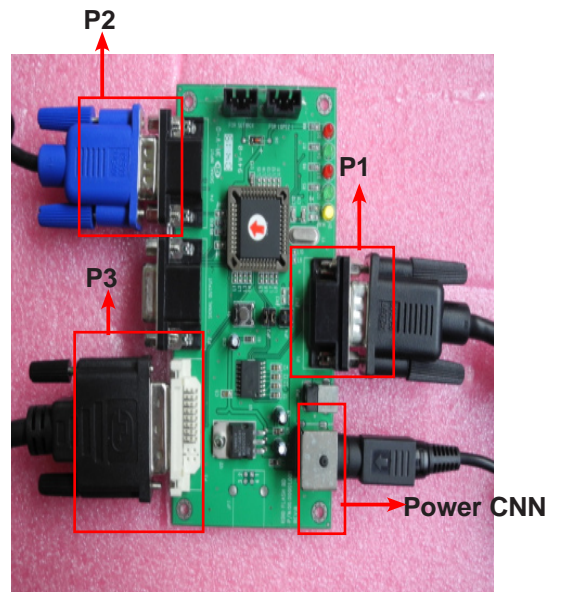
- Projector
- Generic Fixture (80.00001.001) for EDID Key-in
- Power Cord
- RS-232 9 Pin Cable (pin to pin, F-M) (42.83C07G001)
- Monitor
- PC
- VGA cable (42.87305G102)
- Power adapter (47.57803G001) and power cord (42.53506G002) for fixture
- HDMI to DVI Cable(42.00256G001)



## 6-3 Setup Procedure

### 1. Connect all ports

- (1) Connect P1 of Fixture with COM Port of PC/Laptop by RS232 Cable.
- (2) Connect P2 of Fixture with VGA port of Projector by VGA Cable.
- (3) Connect P3 of Fixture with DVI port ,and connect HDMI port of Projector.
- (4) Plug Power Adapter to Power CNN.
- (5) Plug power cord to ML500 unit.



### 2. EDID Firmware Mode

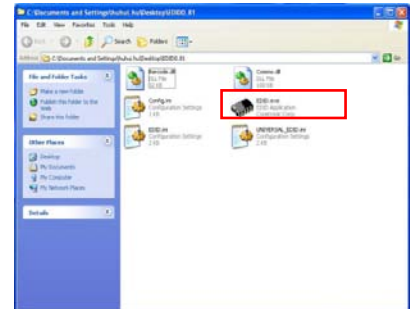
- (1) Hold the “Power” button to plug Power Cord to ML500 unit.
- (2) When the “Power LED” flashes blue, release the “power” button.
- (3) When the “Power LED” flash alternates red with blue, it means the projector has got into EDID FW mode.

## 6-4 EDID Key-In Procedure

### 1. Execute EDID Program

- (1) Click on "EDID" to execute EDID program.

1



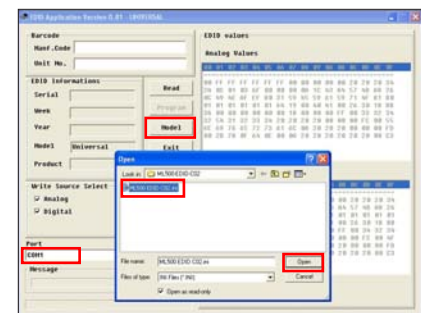
### 2. Process

- (1) Check the COM port is COM1"  
(Select the COM port which you are using).

- (2) Click the Model button.

- (3) Choose the source file "\*.ini" and then open it.

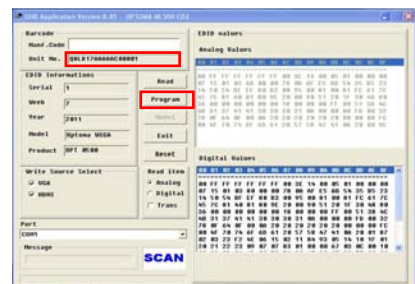
2



3

### 3. Process

- (1) Key in the serial number into the barcode blank space.
- (2) Click "Program" button.
- (3) - "Please change the cable to VGA" will be shown on the screen.  
- Please press "Ok" button.



4.- "Please change the cable to HDMI" will be

shown on the screen.

- Please press "OK" button.

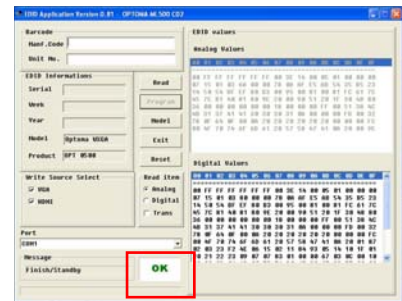
4



5. Finish

(1) "OK" will be shown on the screen.

5



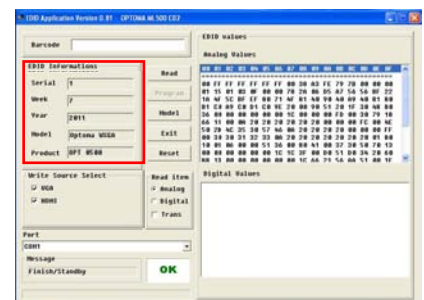
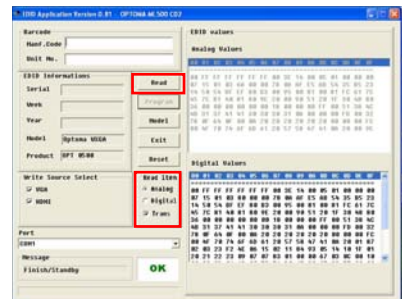
6

6. Read EDID "Analog" information

(1) In the Read item, select "Analog" and "Trans".

(2) Please click "Read".

(3) EDID "Analog" information will show the result.

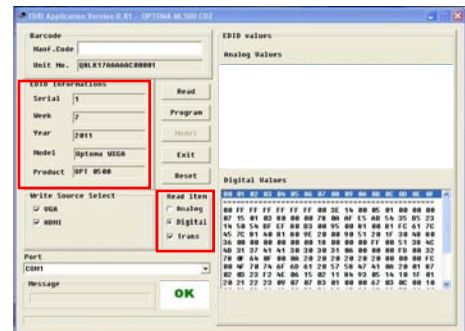


## 7. Read EDID "Digital" information

(1) In the Read item, select "Digital" and "Trans".

(2) Please click "Read" .

(3) EDID "Digital" information will show the result.

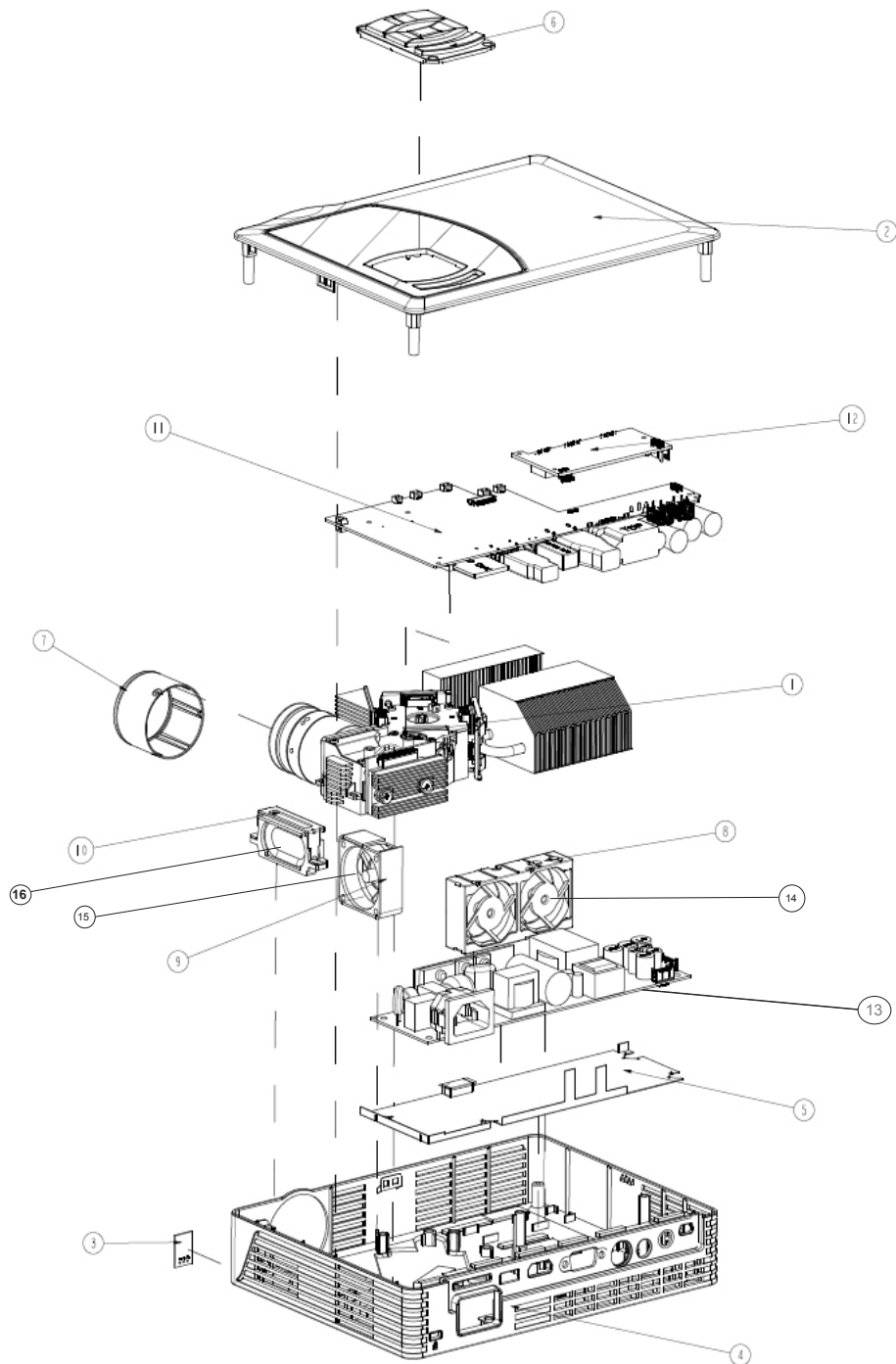


---

# Appendix A (Explode Image)

---

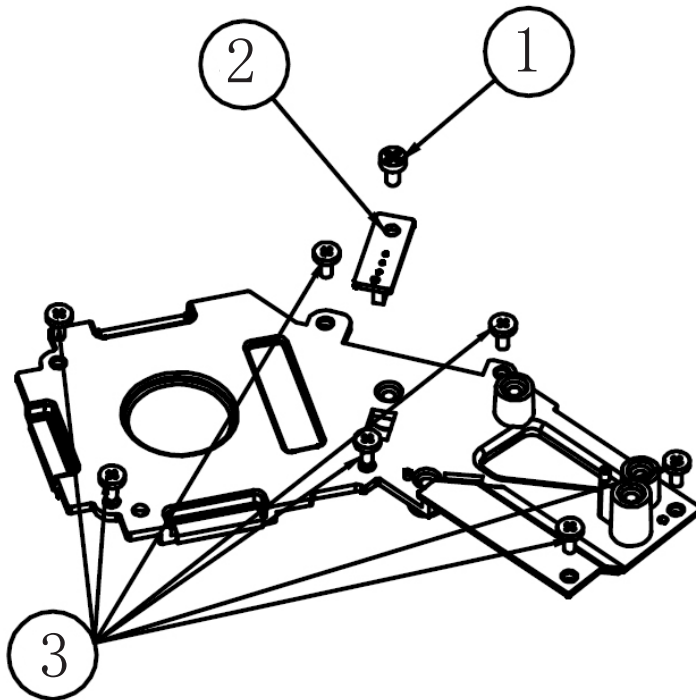
## DC. ML500



ITEM	P/N	DESCRIPTION	Supply
1	70.8LK04GR01	ASSY ENGINE MODULE FOR ML500(SERVICE)	V
2	75.8LK02G001	8LK TOP COVER MODULE	V
3	80.8KU05G001	PCBA FRONT IR SENSOR BOARD FOR K330 PROJECTOR	
4	75.8LK01G001	8LK BOTTOM COVER MODULE	V
5	51.8KU08G002	LVPS MYLAR PLED-W500	
6	51.8LK01G001	8LK KEY BUTTON MODULE	
7	51.8MA06H011	FOCUS RING ABS FOR ML500	
8	52.8KU02G001	FAN RUBBER BLACK K330	
9	52.8LK02G001	ML500 SPONGE 125*15*0.95mm	
10	61.8MA02H001	SPEAKER BRACKET SECC PLED-W500	
11	80.8LK01G002	PCBA MAIN BD FOR ML500 [PROJECTOR]	V
12	80.8KU07G011	PCBA LED DRIVER BD LT3743 TYPE FOR K330 PROJECTOR	V
13	75.8KU01GP03	ASSY YGE CT-P120 LVPS FOR K330 LED 500lm	V
14	49.8KU11G001	DELTA 35X35X15 AXIAL FAN LENGTH=120mm	V
15	49.8FS01G001	DELTA 35*15 AXIAL FAN	V
16	49.8KU01G001	SPEAKER MINI 2W 4ohm 100mm K330	V

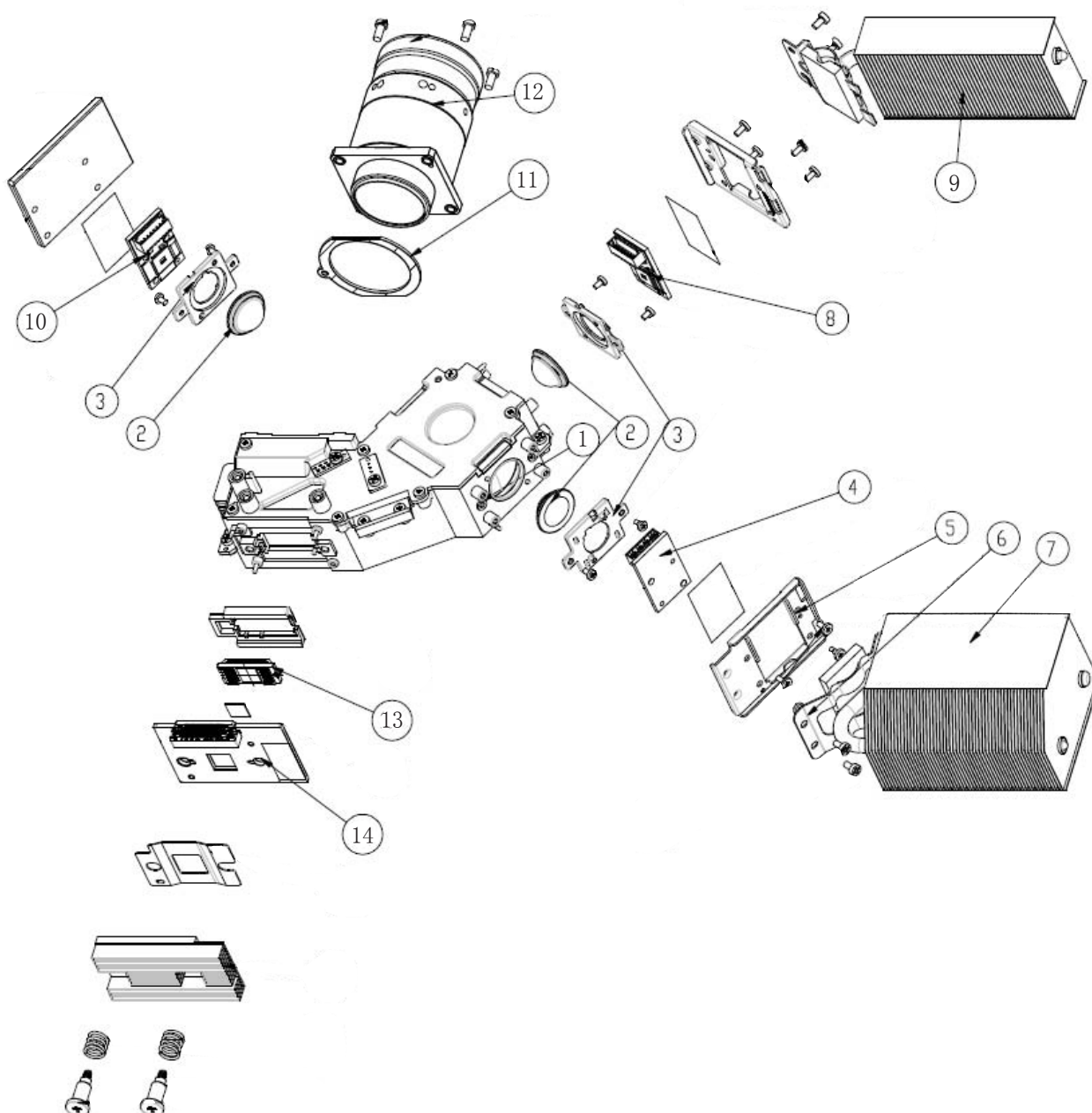


## LIGHT SENSOR BOARD



ITEM	P/N	DESCRIPTION	Supply
1	85.1A622G040	SCREW PAN MECH M2*4 BLACK NYLOK	
2	80.8KU04G001	PCBA LIGHT SENSOR BD FOR K330 PROJECTOR	V
3	85.1A121G040	SCREW PAN MECH M1.7*4 Ni	

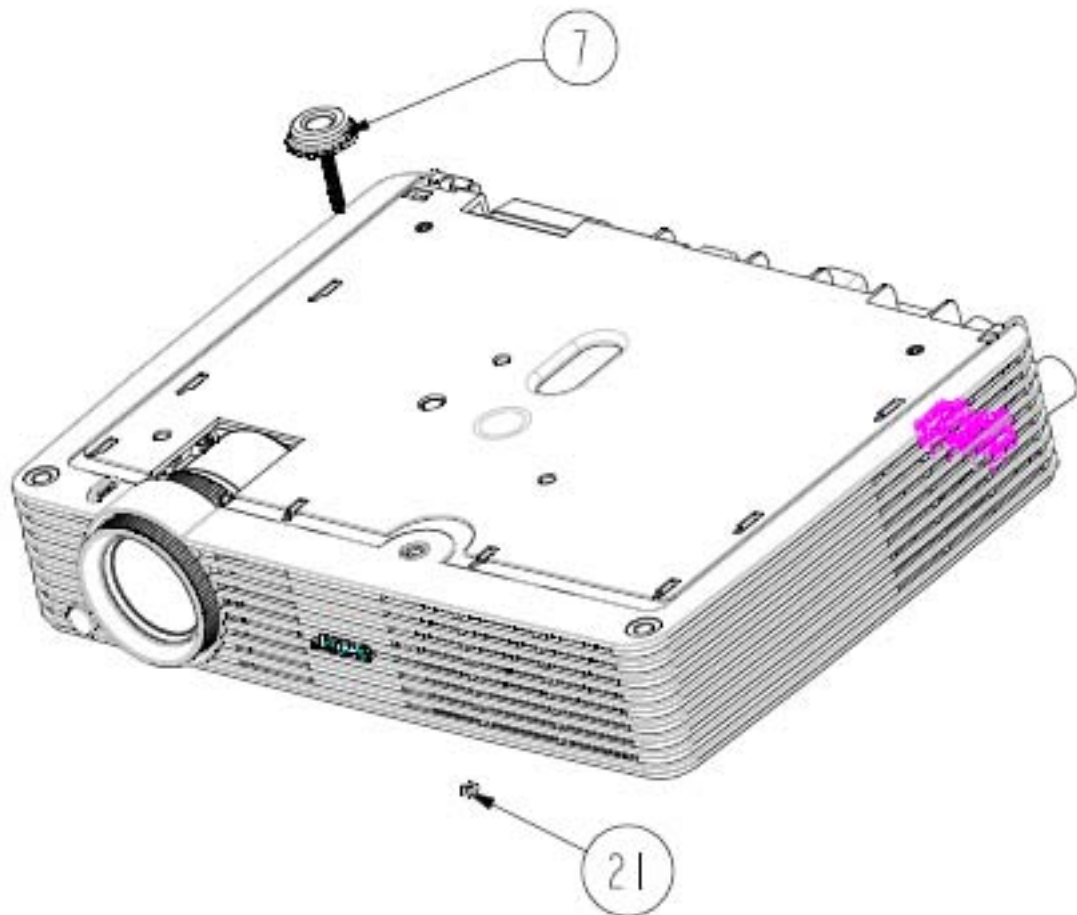
# ENGINE MODULE



ITEM	P/N	DESCRIPTION	Supply
1	70.8LK04GR01	ASSY ENGINE MODULE FOR ML500 (SERVICE)	V
2	23.8KU20G011	D52 COLLIMETER C1 S-LAM 60 T7.1 D14.2, Kinko	
3	51.8KU20H001	COLLIMATOR 1 COVER C1NEW A PC+20%GF G-3420 ENG D52	
4	23.8KU15G002	PT54, GREEN LED, Standard Die Config, D52 400LM, Luminus	V
5	61.8KU02H001	HS FIXPHOLD G SECC K330	

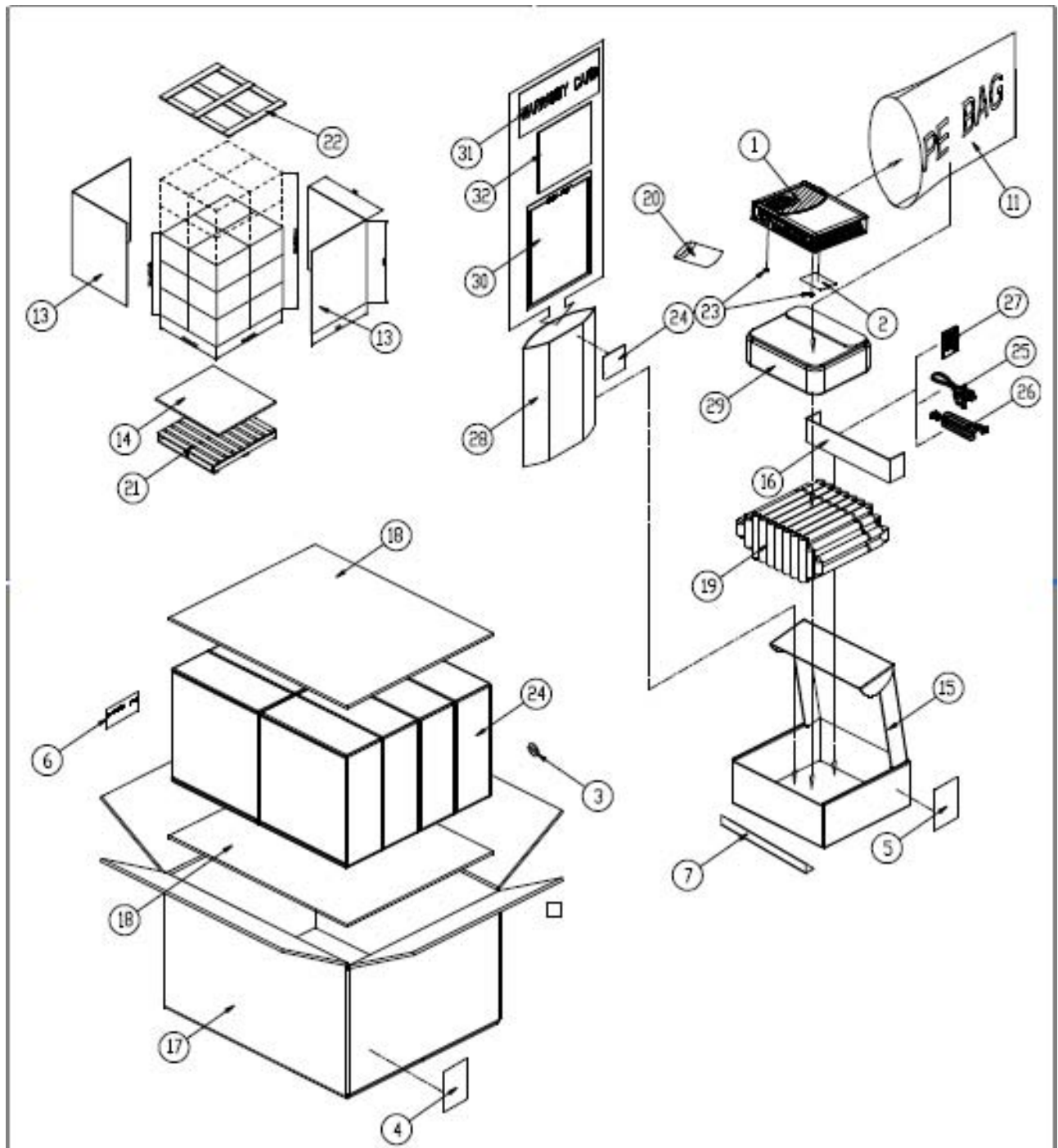
ITEM	P/N	DESCRIPTION	Supply
6	61.8KU03H001	HS CLAMP G SUS K330	
7	61.8KU04H001	HEAT PIPE MODULE GREEN C1NEW K330	
8	23.8KU15G001	PT54,RED LED,Standard Die Config,D52 400LM,Luminus	V
9	61.8KU05H002	HEAT PIPE MODULE RED C1NEW K330	
10	23.8KU15G003	PT54,BLUE LED,Standard Die Config,D52 400LM,Luminus	
11	52.8KU10G001	RUBBER Projection Lens ENG D52	
12	51.8MA06H011	FOCUS RING ABS FOR ML500	
13	48.8KU01G001	DMD 1140x910 PIXEL 0.45" WXGA DDR Type Series 310 DMD "TI"	V
14	80.8KU02G001	PCBA DMD BOARD FOR K330 PROJECTOR	V

## ADJUST FOOT



ITEM	P/N	DESCRIPTION	Supply
1	52.8FS02H001	ADJUST FOOT K11	
2	86.00122G015	NUT HEX M2.0*0.4P L15 Ni	

# Assy Packing Drawing



ITEM	P/N	DESCRIPTION	Supply
1	DC.8LK01G00A	D.C.ML500	
	DP.8LK01G00A	D.P.ML500	
2	35.8MA02G001	SPEC LABEL TL5M#50 70*48*0.2 PLED-W500	
3	35.00040G001	LABEL 30mm, GREEN	
4	35.52302G091	LABEL CARTON 108*92 BLANK	
5	35.86301G031	UNIT BOX LABEL WHITE PK-101	
6	35.80N05G001	PALLET LABEL (W)100mm X(H)53mm FOR OPTOMA MODEL	
7	51.0000AG011	PACKING TAPE 72MM FOR OPTOMA	
8	51.00037G001	TRANSPARENT TAPE 2.4cm	
9	51.00069G001	PACKING STRAP 13.5MM*1500M*0.7MM GREEN	
10	51.00070GC01	PE STRETCH FILM 500MM*1500M*0.02MM GREEN FOR CPC	
11	51.00174G002	PE BAG 380*310*0.07mm FOR OPTOMA	
12	51.86848G001	3 INCH*100m WHITE ADHESIVE	
13	55.83R03G002	L TYPE PAPER 1190x1000x1350 EP747	
14	55.87202GC01	BOTTOM PAPER COVER PLATE 1230*	
15	55.8LK01G001	UNIT BOX ML500	V
16	55.8LK02G001	CARDBOARD ML500	
17	55.8LK03G001	CARTON OUTSIDE BOX AB FLUTE ML500	V
18	55.8LK04G001	PAPER PARTITION ML500	
19	56.8LK01G001	AIR BAG ML500	
20	57.00001G001	PACK SIO2 DRIER 20g	

ITEM	P/N	DESCRIPTION	Supply
21	58.54603G002	NEW WOOD PALLET120*100*13cm (DOUBLE FACE) FOR COMPAQ	
22	58.54604G001	COVER PALLET 120*100cm FOR COMPAQ	
23	52.8KU01G001	RUBBER FOOT BLACK K330	
	AK.8LK01G00A	A.K.ML500	
24	35.82001G111	AK LABEL 3"*3" BLANK	
25	42.50115G001	CABLE POWER CORD 1.8M SP30+IS14 US	V
26	42.00200G005	CABLE VGA 15P 1.8M BLK EP739	V
27	45.8LK01G001	REMOTE CONTROL FOR ML500	V
28	51.80135G002	PE BAG ZIPPER 240*170*0.04 #8 FOR OPTOMA	
29	53.8LK01G001	SOFT BAG ML500	V
30	36.8LK01G001	QUICK START CARD MULTILINGUAL	
31	36.00024G021	WARRANTY CARD US FOR OPTOMA, 1 YEAR W/O BATTERY	
32	36.00040G011	INSTRUCTION CARD (OPTOMA)-BEFORE RETURN FOR PICO	

## Appendix B

## I. Serial Number System Definition

## Serial Number Format for Projector

Q   8LK   1   17   AAAAA   C   0001

1            2            3            4                    5            6            7

**1 : Q = Optoma**

**2 : 8LK = Project Code (ML500)**

**3 : 0 = Last number of the manufacture year (ex:2011 = 1)**

4 : 17 = week of the manufacture year (ex:the seventeenth week of the year = 17)

**5 : AAAAA = not-defined**

**6 : C = Manufacture factory (CPC)**

**7 : 0001 = Serial Code**

EX: Q8LK017AAAAAC0001

This label "Q8LK117AAAAAC0001" represents the serial number for ML500. It is produced at CPC on seventeenth of 2011. Its serial code is 0001.



# II. PCBA Code Definition

## PCBA Code for Projector

A   B   XXX   XXXXXXXXXX   CC   XXX   EEEE  
①   ②   ③   ④   ⑤   ⑥   ⑦

- ① : ID
- ② : Vendor Code
- ③ : Firmware Version
- ④ : P/N
- ⑤ : MB Version
- ⑥ : Date Code
- ⑦ : S/N